

Toshiba Personal Computer
TECRA A8 series /
Satellite Pro A120 series
Maintenance Manual

TOSHIBA CORPORATION

File Number 960-573

[CONFIDENTIAL]

Copyright

© 2006 by Toshiba Corporation. All rights reserved. Under the copyright laws, this manual cannot be reproduced in any form without the prior written permission of Toshiba. No patent liability is assumed with respect to the use of the information contained herein.

Toshiba Personal Computer TECRA A8 series / Satellite Pro A120 series Maintenance Manual

First edition June 2006

Disclaimer

The information presented in this manual has been reviewed and validated for accuracy. The included set of instructions and descriptions are accurate for the TECRA A8 series / Satellite Pro A120 series at the time of this manual's production. However, succeeding computers and manuals are subject to change without notice. Therefore, Toshiba assumes no liability for damages incurred directly or indirectly from errors, omissions, or discrepancies between any succeeding product and this manual.

Trademarks

IBM is a registered trademark and IBM PC is a trademark of International Business Machines Corporation.

Intel, Intel SpeedStep, Intel Core, Celeron and Centrino are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries/regions.

Windows and Microsoft are registered trademarks of Microsoft Corporation.

Photo CD is a trademark of Eastman Kodak.

Bluetooth is a trademark owned by its proprietor and used by TOSHIBA under license.

i.LINK is a trademark of Sony Corporation.

Preface

This maintenance manual describes how to perform hardware service maintenance for the Toshiba Personal Computer TECRA A8 series / Satellite Pro A120 series.

The procedures described in this manual are intended to help service technicians isolate faulty Field Replaceable Units (FRUs) and replace them in the field.

SAFETY PRECAUTIONS

Four types of messages are used in this manual to bring important information to your attention. Each of these messages will be italicized and identified as shown below.

DANGER: “Danger” indicates the existence of a hazard that could result in death or serious bodily injury, if the safety instruction is not observed.

WARNING: “Warning” indicates the existence of a hazard that could result in bodily injury, if the safety instruction is not observed.

CAUTION: “Caution” indicates the existence of a hazard that could result in property damage, if the safety instruction is not observed.

NOTE: “Note” contains general information that relates to your safe maintenance service.

Improper repair of the computer may result in safety hazards. Toshiba requires service technicians and authorized dealers or service providers to ensure the following safety precautions are adhered to strictly.

- Be sure to fasten screws securely with the right screwdriver. If a screw is not fully fastened, it could come loose, creating a danger of a short circuit, which could cause overheating, smoke or fire.
- If you replace the battery pack or RTC battery, be sure to use only the same model battery or an equivalent battery recommended by Toshiba. Installation of the wrong battery can cause the battery to explode.

The manual is divided into the following parts:

- Chapter 1 Hardware Overview describes the TECRA A8 series / Satellite Pro A120 series system unit and each FRU.
- Chapter 2 Troubleshooting Procedures explains how to diagnose and resolve FRU problems.
- Chapter 3 Test and Diagnostics describes how to perform test and diagnostic operations for maintenance service.
- Chapter 4 Replacement Procedures describes the removal and replacement of the FRUs.
- Appendices The appendices describe the following:
- Handling the LCD module
 - Board layout
 - Pin assignments
 - Keyboard scan/character codes
 - Key layout
 - Wiring diagrams
 - BIOS rewrite procedures
 - EC/KBC rewrite procedures
 - Reliability

Conventions

This manual uses the following formats to describe, identify, and highlight terms and operating procedures.

Acronyms

On the first appearance and whenever necessary for clarification acronyms are enclosed in parentheses following their definition. For example:

Read Only Memory (ROM)

Keys

Keys are used in the text to describe many operations. The key top symbol as it appears on the keyboard is printed in **boldface** type.

Key operation

Some operations require you to simultaneously use two or more keys. We identify such operations by the key top symbols separated by a plus (+) sign. For example, **Ctrl + Pause (Break)** means you must hold down **Ctrl** and at the same time press **Pause (Break)**. If three keys are used, hold down the first two and at the same time press the third.

User input

Text that you are instructed to type in is shown in the boldface type below:

DISKCOPY A: B:

The display

Text generated by the computer that appears on its display is presented in the type face below:

```
Format complete  
System transferred
```

Table of Contents

Chapter 1 Hardware Overview

1.1	Features	1-1
1.2	2.5-inch Hard Disk Drive.....	1-14
1.3	Keyboard.....	1-16
1.4	Optical Drive.....	1-17
1.5	TFT Color Display	1-21
1.6	Power Supply	1-24
1.7	Batteries	1-28
1.8	AC Adaptor.....	1-30

Chapter 2 Troubleshooting Procedures

2.1	Troubleshooting	2-1
2.2	Troubleshooting Flowchart.....	2-3
2.3	Power Supply Troubleshooting.....	2-7
2.4	System Board Troubleshooting.....	2-21
2.5	USB FDD Troubleshooting	2-45
2.6	HDD Troubleshooting	2-48
2.7	Keyboard and Touch pad Troubleshooting.....	2-53
2.8	Display Troubleshooting.....	2-56
2.9	Optical Drive Troubleshooting	2-58
2.10	Modem Troubleshooting.....	2-60
2.11	LAN Troubleshooting.....	2-62
2.12	Bluetooth Troubleshooting	2-63
2.13	Wireless LAN Troubleshooting.....	2-65
2.14	Sound Troubleshooting.....	2-67
2.15	SD card Slot Troubleshooting.....	2-70
2.16	Fingerprint sensor Troubleshooting.....	2-71

Chapter 3 Tests and Diagnostics

3.1	The Diagnostic Test	3-1
3.2	Executing the Diagnostic Test	3-4
3.3	Setting of the hardware configuration	3-9
3.4	Heatrun Test.....	3-11
3.5	Subtest Names.....	3-12
3.6	System Test.....	3-14
3.7	Memory Test.....	3-16
3.8	Keyboard Test.....	3-17
3.9	Display Test	3-18
3.10	Floppy Disk Test.....	3-21
3.11	Printer Test.....	3-23
3.12	Async Test	3-25
3.13	Hard Disk Test	3-26
3.14	Real Timer Test.....	3-29
3.15	NDP Test.....	3-31
3.16	Expansion Test.....	3-32
3.17	CD-ROM/DVD-ROM Test	3-34
3.18	Error Code and Error Status Names.....	3-35
3.19	Hard Disk Test Detail Status	3-38
3.20	ONLY ONE TEST.....	3-40
3.21	Head Cleaning.....	3-47
3.22	Log Utilities	3-48
3.23	Running Test.....	3-50
3.24	Floppy Disk Drive Utilities.....	3-51
3.25	System Configuration	3-56
3.26	Wireless LAN Test Program (Atheros)	3-58
3.27	Wireless LAN Test Program (Intel-made b/g, a/b/g).....	3-65
3.28	LAN/Modem/Bluetooth/IEEE1394 Test Program	3-69
3.29	Sound Test program.....	3-84
3.30	SETUP	3-90

Chapter 4 Replacement Procedures

4.1	General.....	4-1
4.2	Battery pack	4-8
4.3	PC card.....	4-10
4.4	SD card.....	4-11
4.5	HDD.....	4-12
4.6	MDC/Memory module.....	4-16
4.7	Keyboard.....	4-19
4.8	Optical drive.....	4-22
4.9	Wireless LAN card	4-25
4.10	Cover assembly.....	4-27
4.11	SW membrane.....	4-31
4.12	Fingerprint sensor board	4-33
4.13	Touch pad.....	4-35
4.14	SD card slot.....	4-38
4.15	Bluetooth module.....	4-39
4.16	Serial/S-Video board.....	4-41
4.17	RTC battery	4-42
4.18	Modem jack	4-44
4.19	Fan.....	4-45
4.20	System board.....	4-47
4.21	Battery lock.....	4-49
4.22	HDD cable	4-51
4.23	Heat sink/CPU	4-52
4.24	PC card slot.....	4-56
4.25	LCD unit/FL inverter	4-57
4.26	Cover latch	4-62
4.27	Display rear cover	4-63
4.28	Wireless LAN antenna/Bluetooth antenna.....	4-65
4.29	Hinge.....	4-71
4.30	Speaker.....	4-73
4.31	Fluorescent Lamp.....	4-77

Appendices

Appendix A	Handling the LCD Module	A-1
Appendix B	Board Layout	B-1
Appendix C	Pin Assignments.....	C-1
Appendix D	Keyboard Scan/Character Codes	D-1
Appendix E	Key Layout.....	E-1
Appendix F	Wiring Diagrams.....	F-1
Appendix G	BIOS rewrite Procedures	G-1
Appendix H	EC/KBC rewrite Procedures	H-1
Appendix I	Reliability.....	I-1

Chapter 1

Hardware Overview

Chapter 1 Contents

1.1	Features.....	1-1
1.2	2.5-inch Hard Disk Drive	1-14
1.3	Keyboard	1-16
1.4	Optical Drive	1-17
	1.4.1 CD-ROM Drive	1-17
	1.4.2 DVD-ROM Drive	1-18
	1.4.3 DVD-ROM & CD-R/RW Drive	1-19
	1.4.4 DVD-Super Multi Drive	1-20
1.5	TFT Color Display	1-21
	1.5.1 LCD Module	1-21
	1.5.2 FL Inverter Board	1-23
1.6	Power Supply.....	1-24
1.7	Batteries	1-28
	1.7.1 Main Battery	1-28
	1.7.2 RTC battery.....	1-29
1.8	AC Adaptor	1-30

Figures

Figure 1-1	Front of the computer	1-5
Figure 1-2	System unit configuration.....	1-6
Figure 1-3-1	System unit block diagram (Intel chipset model).....	1-7
Figure 1-3-2	System unit block diagram (ATI chipset model)	1-7
Figure 1-4	2.5-inch HDD	1-14
Figure 1-5	Keyboard	1-16
Figure 1-6	LCD module	1-21

Tables

Table 1-1	2.5-inch HDD specifications	1-14
Table 1-2	CD-ROM drive specifications.....	1-17
Table 1-3	DVD-ROM drive specifications.....	1-18
Table 1-4	DVD-ROM & CD-R/RW drive specifications.....	1-19
Table 1-5	DVD Super Multi drive specifications	1-20
Table 1-6	LCD module specifications	1-21
Table 1-7	FL inverter board specifications.....	1-23
Table 1-8-1	Power supply output rating (Intel chipset model)	1-25
Table 1-8-2	Power supply output rating (ATI chipset model).....	1-26
Table 1-9	Battery specifications	1-28
Table 1-10	Time required for charges	1-28
Table 1-11	Data preservation time.....	1-29
Table 1-12	RTC battery charging/data preservation time.....	1-29
Table 1-13	AC adapter specifications.....	1-30

1.1 Features

The Toshiba TECRA A8 series / Satellite Pro A120 series Personal Computer uses advanced Large Scale Integration (LSI), and Complementary Metal-Oxide Semiconductor (CMOS) technology extensively to provide compact size, minimum weight, low power usage and high reliability. This computer incorporates the following features.

There some models and options according to BTO system. Refer to the Parts List for the configuration of each model and options.

Microprocessor

The TECRA A8 series / Satellite Pro A120 series computer is equipped with one of the following processors.

Intel® Core™ Duo

Core™ Duo	1.66GHz (Processor Number : T2300E)
	1.66GHz (Processor Number : T2300)
	1.83GHz (Processor Number : T2400)
	2.00GHz (Processor Number : T2500)
	2.16GHz (Processor Number : T2600)
	2.33GHz (Processor Number : T2700)

Intel® Core™ Solo

Core™ Solo	1.66GHz (Processor Number : T1300)
	1.83GHz (Processor Number : T1400)

Intel® Celeron® M

Celeron® M	1.46GHz (Processor Number : 410)
	1.60GHz (Processor Number : 420)
	1.73GHz (Processor Number : 430)

Chipset

Equipped with ATI RC420MB or Intel 945GM as North Bridge, ATI SB450 or Intel ICH7-M as South Bridge and Texas Instrument PCI7412 as Card Controller.

VGA Controller

An internal Graphics Controller in North Bridge is used.

Memory

Two DDR2-533/DDR2-667 SDRAM slots. Memory modules can be installed to provide a maximum of 4GB (Intel Chipset model) or 2GB (ATI Chipset model). Memory modules are available in 256MB, 512MB, 1024MB and 2048MB sizes.

 HDD

The computer has a 2.5-inch SATA HDD. The following capacities are available.

- 40/60/80/100/120 GB

 USB FDD

A 3.5-inch USB FDD accommodates 2HD (1.44MB) or 2DD (720KB) disks.

 Optical Drive

CD-ROM drive, DVD-ROM drive, DVD-ROM & CD-R/RW drive or DVD Super Multi drive (double layer) can be installed.

 Display

LCD : Built-in 15.4 inch, 16M colors, WXGA(1280×800dots) thin type low temperature poly-silicon TFT color display.

External monitor : Supported via an RGB connector.

TV-out : Supporting VIDEO-out. (Only for models S-VIDEO jack mounted)

 Keyboard

An-easy-to-use 84(US)/85(UK)-key keyboard provides a numeric keypad overlay for fast numeric data entry or for cursor and page control. The keyboard also includes two keys that have special functions in Microsoft® Windows® XP.

 Touch pad

A Touch Pad and control buttons in the palm rest enable control of the on-screen pointer and scrolling of windows.

 Batteries

The computer has two batteries: a rechargeable Lithium-Ion main battery pack and RTC battery (that backs up the Real Time Clock and CMOS memory).

Universal Serial Bus (USB2.0)

Three USB ports are provided. The ports comply with the USB2.0 standard.

 IEEE 1394 port

The computer comes with one IEEE 1394 port. It enables high-speed data transfer directly from external devices such as digital video cameras.

 External monitor (RGB) port

The port enables connection of an external monitor, which is recognized automatically by Video Electronics Standards Association (VESA) Display Data Channel (DDC) 2B compatible functions.

 PC card slot

A PC card slot is provided. The PC card slot (PCMCIA) accommodates one Type II card.

 SD card slot

The SD card slot can accommodate Secure Digital flash memory cards with various capacities.

 Fingerprint sensor

The computer is equipped with a fingerprint sensor and fingerprint authentication utility. They enable only person who has registered his/her fingerprint to use the computer.

 Sound system

The sound system is equipped with the following features:

- Stereo speakers
- Volume control
- Stereo headphone jack
- External microphone jack

Internal LAN/ Internal modem

The computer has built-in support for Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100BASE-TX) and Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T).

The computer contains a MDC, enabling data and fax communication.

 Bluetooth

The computer is equipped with Bluetooth (V2.0+EDR) communications standard enable wireless connection between electronic devices such as computers and printers. It supports wireless communication switch.

 Wireless LAN

The computer is equipped with PCI Express Mini Card type wireless LAN card that supports 802.11 b/g or 802.11 a/b/g in the PCI Express Mini Card slot. This function can be switched on and off by a switch on the computer.

 Presentation button

This button switches the display between internal display, external display, simultaneous display and multi-monitor display.

 TOSHIBA Assist button

When this button is pressed during power-on, the computer is connected to “Toshiba Assist”. When this button is pressed during power-off, the computer is turned on and connected to “Toshiba Assist”.

The front of the computer is shown in figure 1-1.

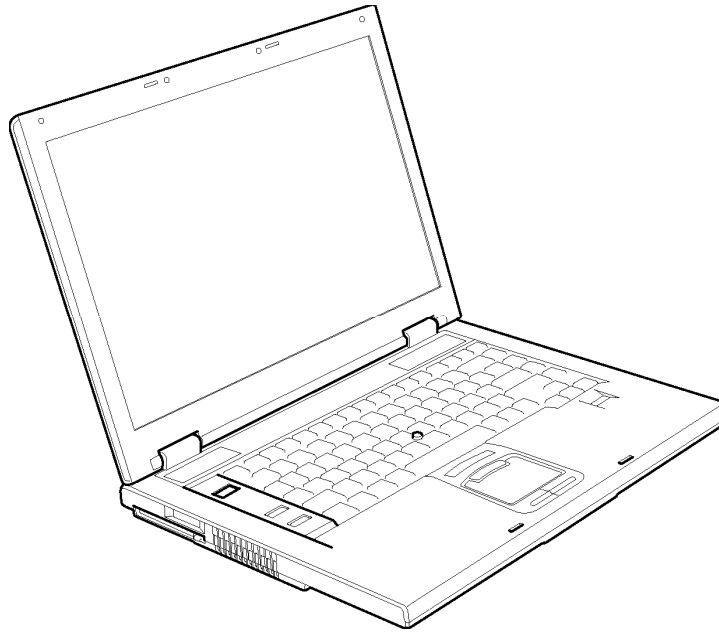


Figure 1-1 Front of the computer

The system unit configuration is shown in figure 1-2.

FHB1xx: Intel Chipset model

FHBAXx: ATI Chipset model

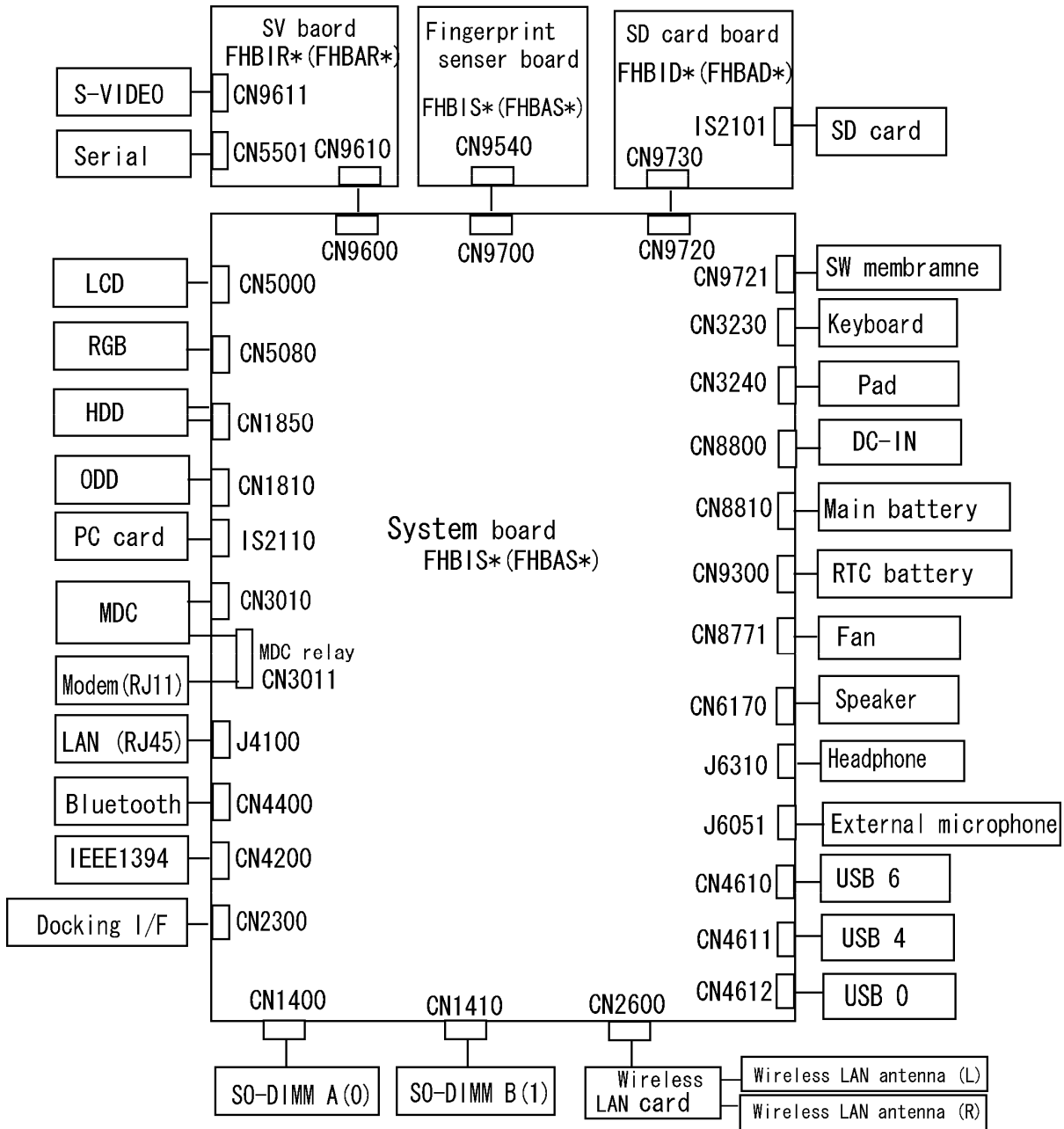


Figure 1-2 System unit configuration

Figure 1-3-1, 1-3-2 is a block diagram of the system unit.

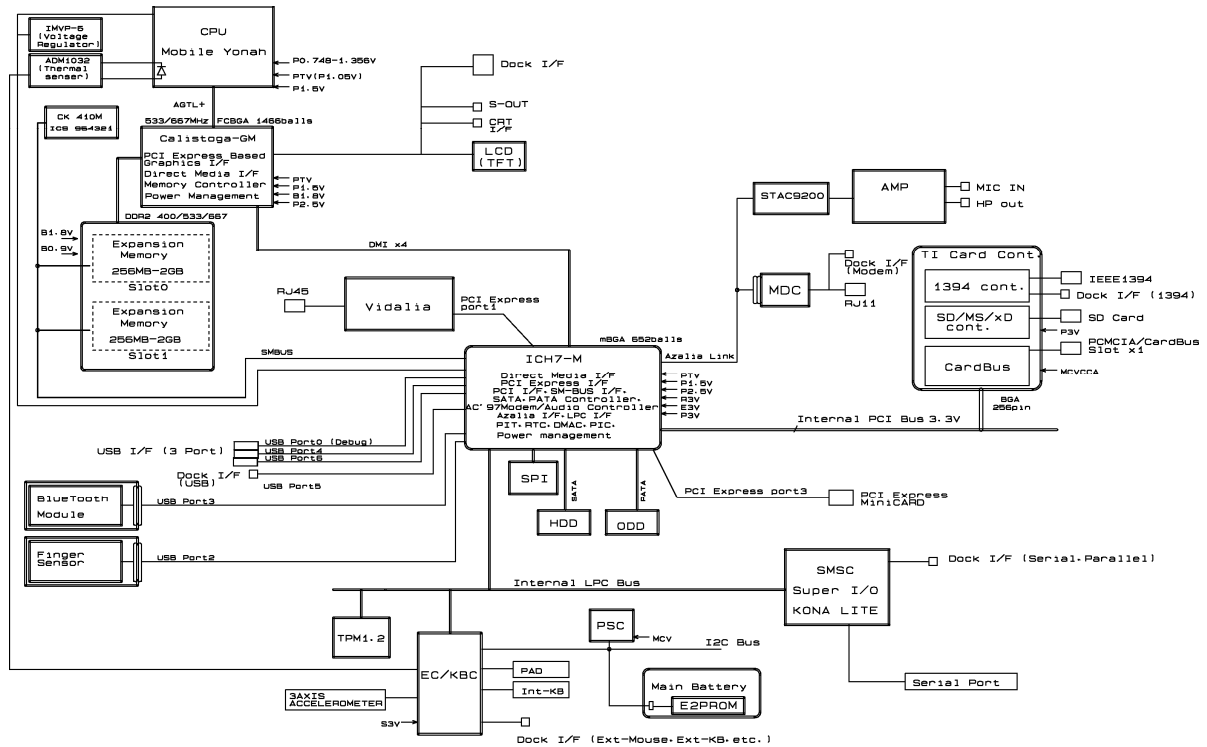


Figure 1-3-1 System unit block diagram (Intel chipset model)

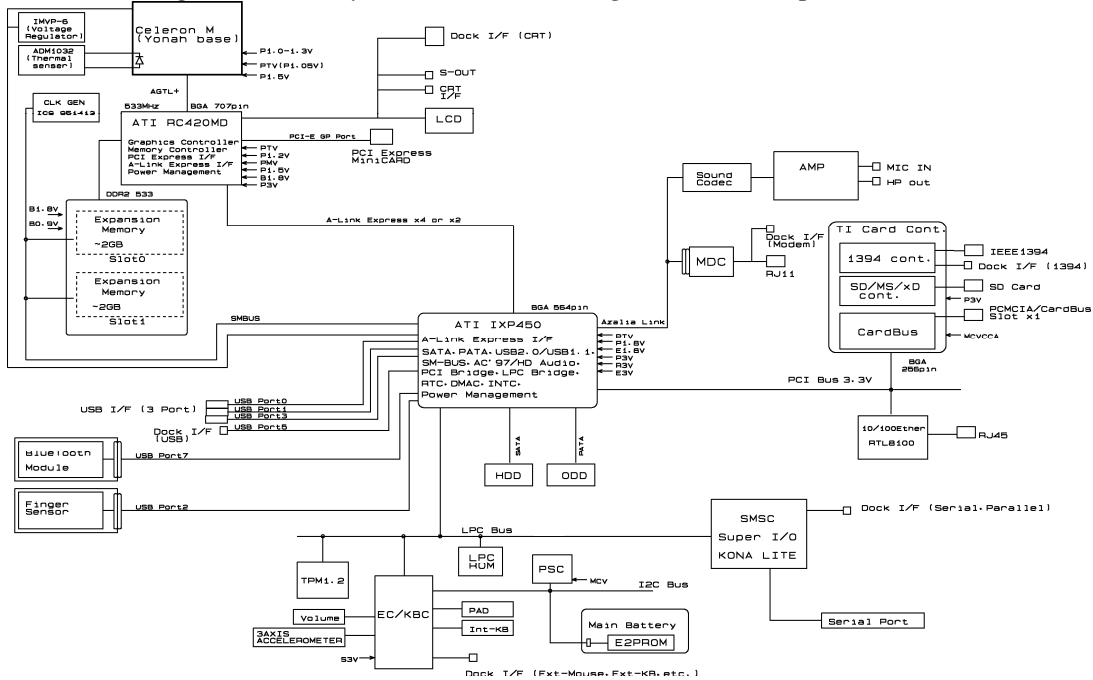


Figure 1-3-2 System unit block diagram (ATI chipset model)

The system unit is composed of the following major components:

❑ Processor

Intel® Core™ Duo Processor (dual core), Intel® Core™ Solo Processor (single core) or Intel® Celeron® M Processor is mounted.

Intel® Core™ Duo Processor:

- | | |
|-------|------------------|
| Speed | 1.66GHz (T2300E) |
| | 1.66GHz (T2300) |
| | 1.83GHz (T2400) |
| | 2.00GHz (T2500) |
| | 2.16GHz (T2600) |
| | 2.33GHz (T2700) |
- Integrated L1 cache memory of 64KB (32KB +32KB)
 - Integrated L2 cache memory of 2MB
 - Processor bus speed: 667MHz
 - Core voltage: 1.300 to 1.1625V
 - 478-pin Micro FC-PGA package

Intel® Core™ Solo Processor

- | | |
|-------|-----------------|
| Speed | 1.66GHz (T1300) |
| | 1.83GHz (T1400) |
- Integrated L1 cache memory of 64KB (32KB +32KB)
 - Integrated L2 cache memory of 2MB
 - Processor bus speed: 667MHz
 - Core voltage: 1.300 to 1.1625V
 - 478-pin Micro FC-PGA package

Intel® Celeron® M Processor

- | | |
|-------|---------------|
| Speed | 1.46GHz (410) |
| | 1.60GHz (420) |
| | 1.72GHz (430) |
- Integrated L1 cache memory of 64KB (32KB +32KB)
 - Integrated L2 cache memory of 1MB
 - Processor bus speed: 533MHz
 - Core voltage: Multiple VID
 - 478-pin Micro FC-PGA package

❑ Memory

Two memory slots capable of accepting DDR2-SDRAM 256MB, 512MB, 1024MB or 2048MB memory modules for a maximum of 4GB (Intel Chipset model) or 2GB (ATI Chipset model).

- 200-pin Small Outline DIMM
- 1.8V operation
- PC2-4200(DDR2-533)/PC2-5300(DDR2-667) support

❑ BIOS ROM

- 8Mbits of flash memory are used.
 - 320KB for System BIOS
 - 64KB for VGA BIOS
 - 64KB for Fingerprint sensor
 - 64KB for LAN BIOS
 - 24KB for Boot
 - 16KB for Parameter Block
 - 32KB for Option Log
 - Others

❑ North Bridge

- Intel 945GM:
 - Supports Yonah Processor System Bus
 - Supports System Memory : DDR2-400/DDR2-533/DDR2-667, 4GB(max)
 - Internal Graphics Controller : Inter Generation 3.5 Integrated GFX Core (250MHz)
 - DMI(Direct Media Interface)
 - Supports ICH.
 - 1466-ball 37.5×37.5×2.56mm FC-BGA package

- ATI RC420MD:
 - Graphic controller
 - System Memory controller : DDR2-400/DDR2-533/DDR2-667, 2GB(max)

- PCI Express interface
- A-Link Express
- Supports ICH
- Power management

❑ South Bridge

- Intel ICH7-M:
 - DMI(Direct Media Interface)
 - PCI Express I/F (4 ports)
 - PCI Bus I/F Rev2.3 (6 PCI REQ/GNT Pairs)
 - Integrated Serial ATA Host Controller (2 Prots,150MB/S)
 - Integrated IDE Controller (Ultra ATA 100/66/33)
 - AC'97 2.3 codecs
 - Intel High Definition controller (Azalia)
 - USB 1.1/2.0 Controller 8 ports
 - Built-in LAN controller (WfM 2.0 & IEEE 802.3 compliance)
 - Power Management (ACPI 2.0 compliance)
 - SMBus2.0 controller
 - Low Pin Count (LPC) interface (EC/KBC, Super I/O)
 - IRQ controller
 - Serial Interrupt Function
 - Suspend/Resume control
 - Built –in RTC
 - GPIO
 - 652-ball 31×31×2.51mm BGA Package

- ATI SB450:
 - PCI Local Bus Specification, Revision 2.3-compliant with support for 33MHz PCI operations
 - PCI Express (4 PCI Express root ports)
 - ACPI 2.0 compliant
 - Enhanced DMA Controller, Interrupt Controller, and Timer Functions
 - Integrated Serial ATA Host Controller (4 ports)
 - Integrated IDE controller supports Ultra ATA 100/66/33 (2 ports)

- USB host interface with support for 8 USB ports; 2 OHCI host controllers; 1 EHCI high-speed USB 2.0 Host Controller
- Integrated LAN Controller
- System Management Bus (SM Bus) Specification, Version 2.0 with additional support for I2C devices
- Intel High Definition Audio Interface
- Supports Audio Codec '97, Revision 2.3 specification or HD Audio
- Low Pin Count (LPC) interface
- Firmware Hub (FHW) interface support
- Alert On LAN (AOL)
- Package 564 pin BGA (31 x 31mm)

□ PC Card Controller (TI PCI7412)

- PCI I/F
- CardBus / Ultra media Controller (1 socket)
- SD/MMC, Memory Stick, XD Card Controller
- 1394 Controller (2 ports)
- 288-ball, 16×16×1.4mm, BGA Package

❑ **VGA**

Graphics interface in North Bridge (Intel 945GM/ATI RC420MB) is used.

❑ **Sound Controller**

- Sound controller built in the South Bridge (Intel ICH7-M/ATI SB450) + ALC262, AN12941A.
 - Internal stereo speakers
 - Volume control
 - Stereo headphone jack
 - External microphone jack

❑ **Modem Controller**

- Askey-made one MDC is used.
- This controller has the following functions:
 - One RJ11 port
 - V.92 (V.90) 56K Modem/FAX
 - Supports Ring Wakeup

Internal LAN

- Ethernet LAN (10 megabits per second, 10BASE-T), Fast Ethernet LAN (100 megabits per second, 100BASE-TX) or Gigabit Ethernet LAN (1000 megabits per second, 1000BASE-T) (only Intel chipset model) is used.
 - Controller
 - Gigabit Ethernet: Gigabit Intel Vidaria
 - Ethernet/Fast Ethernet: RealTek RTL 8100CL
 - One RJ45 port
 - Supports WOL
 - Supports LED

 Wireless LAN

- Intel made or Askey made wireless LAN card in the PCI Express Mini card slot
 - Supports 802.11b/g or 802.11a/b/g
 - Supports Wireless Communication SW
 - Supports WEP
 - Supports WOL (Intel-made wireless LAN card only)

 Other main system chips

- Clock Generator (ICS-made 954321AGLFT)
- EC/KBC (Renesas-made M306KAFCLRP)
- PSC (Toshiba-made TMP86FS49UG)
- Super I/O (LPC-made 47N217)
- Temperature sensor (ADM-made 1032ARMZ ×2)
- Acceleration sensor (ST Micro-made LIS3L02AQ)
- TPM (Infineon-made SLB9635 TT 1.2)

1.2 2.5-inch Hard Disk Drive

The removable HDD is a random access non-volatile storage device. It has a non-removable 2.5-inch magnetic disk and mini-Winchester type magnetic heads.

The computer supports a 40GB, 60GB, 80GB, 100GB or 120GB.

The HDD is shown in figure 1-4. Specifications are listed in Table 1-1.

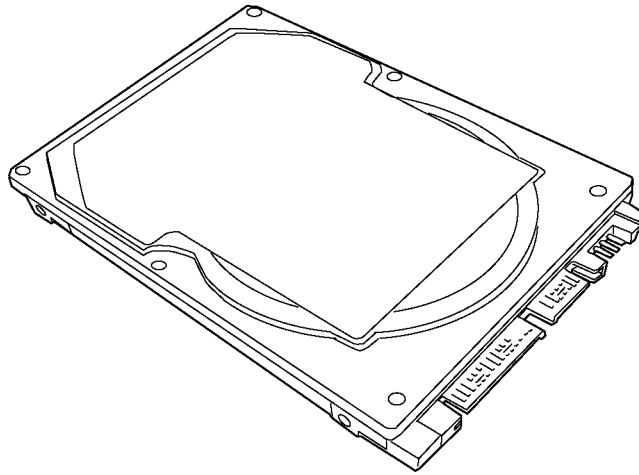


Figure 1-4 2.5-inch HDD

Table 1-1 2.5-inch HDD specifications (1/2)

Items		Specifications			
		FUJITSU G8BC0002W410	FUJITSU G8BC0002W610	FUJITSU G8BC0002W810	FUJITSU G8BC0002WA10
Outline dimensions	Width (mm)	70.0			
	Height (mm)	9.5			
	Depth (mm)	100.0			
	Weight (g)	101 max.			
Storage size (formatted)		40GB	60GB	80GB	100GB
Speed (RPM)		5,400			
Data transfer rate To/From media To/From host		61.3 max. 1.5 (150MB/s) max.			
Data buffer size (MB)		8			
Average seek time (ms) Read		12			
Motor startup time (s)		4 typ.			

Table 1-1 2.5-inch HDD specifications (2/2)

Items		Specifications			
		HITACHI GST G8BC00029410	HITACHI GST G8BC00029610	HITACHI GST G8BC00029810	HITACHI GST G8BC00029A10
Outline dimensions	Width (mm)	69.85±0.25			
	Height (mm)	9.5±0.2			
	Depth (mm)	100.2±0.25			
	Weight (g)	95 max.	102 max.		
Storage size (formatted)		40GB	60GB	80GB	100GB
Speed (RPM)		5,400			
Data transfer rate To/From media To/From host		493 Mb/s max. 1.5Gbps			
Data buffer size (MB)		8			
Average seek time (ms) Read		12 typ.			
Motor startup time (s)		3.5 typ.			

Items		Specifications	
		FUJITSU G8BC0002WC10	HITACHI GST G8BC0002NA10
Outline dimensions	Width (mm)	70	69.85±0.25
	Height (mm)	9.5	9.5±0.2
	Depth (mm)	10	100.2±0.25
	Weight (g)	101 max.	115 max.
Storage size (formatted)		120GB	100GB
Speed (RPM)		5,400	7,200
Data transfer rate To/From media To/From host (Gbps)		61.3 MB/s max 1.5	629 Mb/s max. 1.5
Data buffer size (KB)		8,192	8,192
Average seek time (ms) Read		12 typ	10 typ.
Motor startup time (s)		4 typ.	

1.3 Keyboard

The keyboard is mounted 84(US)/85(UK) keys that consist of character key and control key. The keyboard is connected to membrane connector on the system board and controlled by the keyboard controller.

Figure 1-5 is a view of the keyboard.

See Appendix E about a layout of the keyboard.



Figure 1-5 Keyboard

1.4 Optical Drive

1.4.1 CD-ROM Drive

The CD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD-ROM. The specifications of the CD-ROM are described in Table 1-3.

Table 1-2 CD-ROM drive specifications

Item		Specifications
		TEAC G8CC0002R520
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	12.7(excluding projections)
	Depth (mm)	129.4 (excluding projections)
	Mass (g)	165 or less
Data transfer speed (Read) CD-ROM		Max. 24x CAV
ATAPI Burst (MB/s) Burst Sustained		33.3Mbytes/sec max. 1,545 -3,600kB/sec
Access time (ms) CD-ROM		110 typ.
Supported Disks		CD: CD/CD-ROM (12cm, 8cm), CD-R, CD-RW
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, Enhanced CD

1.4.2 DVD-ROM Drive

The DVD-ROM drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD-ROM, DVD-ROM.

The specifications of the DVD-ROM are described in Table 1-3.

Table 1-3 DVD-ROM drive specifications

Item		Specifications
		TEAC G8CC0002E520
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	12.7(excluding projections)
	Depth (mm)	129.4 (excluding projections)
	Mass (g)	180 or less
Data transfer speed (Read) DVD-ROM CD-ROM		Max. 8x CAV Max. 24x CAV
ATAPI Burst (MB/s) PIO Mode DMA Mode Ultra DMA Mode		16.7 (PIO MODE 0-4) 16.7 (Multi Word Mode 0-2) 33.3 max.
Average access time (ms) CD-ROM DVD-ROM		130 typ. 120 typ.
Supported Disks		CD: CD/CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+R, DVD+RW
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, Enhanced CD, CD-text, Multi-session, Addressing method 2 DVD: DVD-ROM, DVD-R, DVD-RW, DVD-Video, DVD-R/RW(Single/Multi-session, Packet), DVD-RAM (2.6GB/4.7GB)

1.4.3 DVD-ROM & CD-R/RW Drive

The DVD-ROM & CD-R/RW drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD-ROM, DVD-ROM and CD-R/RW.

The specifications of the DVD-ROM & CD-R/RW drive are described in Table 1-4.

Table 1-4 DVD-ROM & CD-R/RW drive specifications

Item		Specifications
		MATSUSHITA G8CC0002J520
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	12.7 (excluding projections)
	Depth (mm)	129 (excluding projections)
	Mass (g)	180±10
Data transfer speed (Read) DVD-ROM CD-ROM		Max. 8x CAV Max. 24x CAV
Data transfer speed (Write) CD-R CD-RW High Speed CD-RW Ultra Speed CD-RW		Max. 24x CAV Max. 4x CLV Max. 10x CLV Max. 24x CAV
ATAPI Burst (MB/s) PIO Mode DMA Mode Ultra DMA Mode		16.6 (PIO MODE4) 16.6 (Multi Word Mode2) 33.3 (Ultra DMA Mode2)
Data Buffer Capacity		2MB
Access time (ms) CD-ROM DVD-ROM		180 typ. (Random) 130 typ. (Random)
Supported Formats		CD: CD/CD-ROM (12cm, 8cm), CD-R, CD-RW, CD-DA, CD-ROM XA, Photo CD, CD-Extra(CD+), CD-text DVD: DVD-ROM, DVD-R, DVD-RW (Ver1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

1.4.4 DVD-Super Multi Drive

The DVD Super Multi drive accommodates either 12 cm (4.72-inch) or 8 cm (3.15-inch) CD-ROM, DVD-ROM, CD-R, CD-RW, DVD-R, DVD+R, DVD-RW, DVD+RW, DVD-RAM, DVD-R DL and DVD+R DL.

The specifications are listed in Table 1-5.

Table 1-5 DVD Super Multi drive specifications

Item		Specifications
		MATSUSHITA G8CC0002T520
Outline dimensions	Width (mm)	128 (excluding projections)
	Height (mm)	9.5 (excluding projections)
	Depth (mm)	129.4 (excluding projections)
	Mass (g)	190±10
Data transfer speed (Read) DVD-ROM CD-ROM		Max. 8x CAV Max. 24x CAV
Data transfer speed (Write) CD-R CD-RW DVD-R DVD-RW DVD-R DL DVD+R DVD+R DL DVD+RW DVD-RAM		Max. 24x ZCLV Max. 10x CLV (Ultra speed) Max. 8x ZCLV Max. 4x CLV Max. 2x ZCLV Max. 8x ZCLV Max. 2.4x CLV Max. 4x ZCLV Max. 3-5x ZCLV (4.7GB)
ATAPI Burst (MB/s) PIO Mode DMA Mode Ultra DMA Mode		16.6 (PIO MODE4) 16.6 (Multi Word Mode2) 33.3 (Ultra DMA Mode2)
Data Buffer Capacity		2MB
Access time (ms) CD-ROM DVD-ROM		150msec typ. 180msec typ.
Supported Disks		CD: CD-ROM (12cm, 8cm), CD-R, CD-RW DVD: DVD-ROM, DVD-R, DVD-RW, DVD-RAM, DVD+RW
Supported Formats		CD: CD-DA, CD-ROM, CD-ROM XA, PHOTO CD, CD-Extra(CD+), CD-text DVD: DVD-R, DVD-RW (Ver. 1.1, 1.2), DVD-Video, DVD+R, DVD+RW, DVD-RAM (2.6GB/4.7GB)

1.5 TFT Color Display

The TFT color display consists of 15.4-inch WXGA LCD module and FL inverter board.

1.5.1 LCD Module

The LCD module used for the TFT color display uses a backlight as the light source and can display a maximum of 16M colors with 1,200 x 800 resolution. The VGA in North Bridge can control internal and external WXGA support displays simultaneously.

Figure 1-6 shows a view of the LCD module and Table 1-6 lists the specifications.

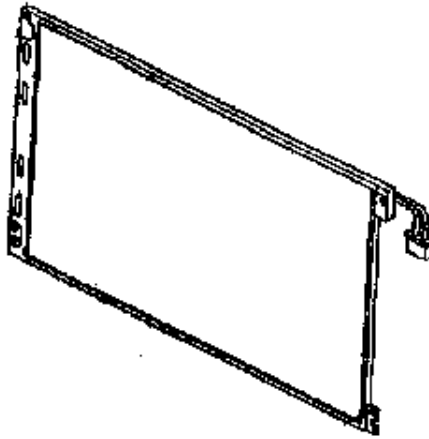


Figure 1-6 LCD module

Table 1-6 LCD module specifications (1/2)

Item	Specifications
	15.4-inch WXGA TFT (LG G33C0003E110)
Number of Dots	1,280(W) x 800(H)
Dot spacing (mm)	0.258(H) x 0.258(V)
Display range (mm)	331.2(H) x 207.0(V)

Item	Specifications
	15.4inch WXGA TFT (LG G33C0003G110)
Number of Dots	1,280(W) x 800(H)
Dot spacing (mm)	0.258(H) x 0.258(V)
Display range (mm)	331.2(H) x 207.0(V)

Table 1-6 LCD module specifications (2/2)

Item	Specifications
	15.4-inch WXGA TFT (SAMSUNG G33C0003F110)
Number of Dots	1,280(W) x 800(H)
Dot spacing (mm)	0.258(H) x 0.258(V)
Display range (mm)	331.2(H) x 207.0(V)

Item	Specifications
	15.4inch WXGA TFT (SAMSUNG G33C0003H110)
Number of Dots	1,280(W) x 800(H)
Dot spacing (mm)	0.258(H) x 0.258(V)
Display range (mm)	331.2(H) x 207.0(V)

1.5.2 FL Inverter Board

The FL inverter board supplies a high frequency current to illuminate the LCD module.

Table 1-7 lists the FL inverter board specifications.

Table 1-7 FL inverter board specifications

Item		Specifications
		G71C00011221
Input	Voltage (VDC)	5
	Power (W)	7
Output	Voltage (Vrms)	750
	Current (mArms)	6.0
	Power (W/VA)	5/7

1.6 Power Supply

The power supply supplies many different voltages to the system board and performs the following functions:

1. Judges that the DC power supply (AC adapter) is connected to the computer.
2. Detects DC output and circuit malfunctions.
3. Controls the display of battery icon and DC IN icon.
4. Turns the battery charging system on and off and detects a fully charged battery.
5. Turns the power supply on and off.
6. Provides the detection of a low battery.
7. Calculates the remaining battery capacity.
8. Controls the transmission of the status signal of the main battery.

The power supply output rating is specified in Table 1-8-1 and 1-8-2.

Table 1-8-1 Power supply output rating (Intel chipset model)

Name	Power supply				
	Voltage [V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No battery	Object
PPV	1.500 - 0.300	No	No	No	CPU
PTV	1.05	No	No	No	CPU, GMCH, ICH7-M
1R5-P1V	1.5	No	No	No	CPU, GMCH, ICH7-M, PCI-e Mini Card
1R8-B1V	1.8	Yes	No	No	GMCH, DDR2-SDRAM
1R8-P1V	1.8	Yes	No	No	GPU, VRAM
2R5-P2V	2.5	No	No	No	GMCH, ICH7-M
LAN2R5-E2V	2.5	Yes	Yes / No	No	LAN
MR0R9-B0V	0.9	Yes	No	No	GMCH, DDR2-SDRAM
0R9-P0V	0.9	No	No	No	DDR2-SDRAM
P3V	3.3	No	No	No	Clock Generator, Thermal Sensor, GMCH, SDRAM(SPD), ICH7-M, HDD, PC-Card Cont., PC-Card Power, PCI-e Mini Card (WLAN), FWH, LED, TPM, LCD, AD1981HD
E3V	3.3	Yes	Yes / No	No	ICH7-M, PCI-e Mini Card (WLAN), MDC, Serial Flash, Finger Sensor
S3V	3.3	Yes	Yes	No	EC/KBC
SD-P3V	3.3	No	No	No	SD card
BT-P3V	3.3	No	No	No	Bluetooth
LAN-E3V	3.3	Yes	Yes / No	No	LAN
LAN1R2-E1V	1.2	Yes	Yes / No	No	LAN
P5V	5	No	No	No	ICH7-M, ODD, HDD, PC-Card Power, LED, KB, PAD, CRT, FAN, FL-Inv
E5V	5	Yes	Yes / No	No	ICH7-M, USB Power
M5V	5	Yes	Yes	No	LED
MCV	5	Yes	Yes	No	PSC
SND-P5V	5	No	No	No	AN12941A
A4R7-P4V	4.7	No	No	No	AD1981HD, AN12941A
R3V	2.0 -3.5	Yes	Yes	Yes	ICH7-M (RTC)

Table 1-8-2 Power supply output rating (ATI chipset model) (1/2)

Name	Power supply				
	Voltage[V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No battery	Object
PPV	1.500 - 0.300	No	No	No	CPU
PTV	1.05	No	No	No	CPU, South Bridge, North Bridge
1R5-P1V	1.5	No	No	No	CPU, PCI-e Mini Card
1R2-P1V	1.2	No	No	No	North Bridge
1R8-B1V	1.8	Yes	No	No	North Bridge, DDR2-SDRAM
1R8-P1V	1.8	Yes	No	No	South Bridge, North Bridge, LAN/SATA-HDD (Clock)
AL1R8P1V	1.8	No	No	No	North Bridge
SB1R8-E1V	1.8	Yes	Yes / No	No	South Bridge
MR0R9-B0V	0.9	Yes	No	No	GMCH, DDR2-SDRAM
0R9-P0V	0.9	No	No	No	DDR2-SDRAM
P3V	3.3	No	No	No	Clock Generator, Thermal Sensor, North Bridge, SDRAM(SPD), South Bridge, SATA-HDD, PC-Card Cont., PC-Card Power, SD Card power, IEEEE1394 EEPROM, PCI-e Mini Card, FWH, LED, TPM, Super I/O, RS-232C,LCD Power, Sound CODEC, HP AMP
E3V	3.3	Yes	Yes / No	No	South Bridge, PCI-e Mini Card, MDC, TPM, Finger Sensor
S3V	3.3	Yes	Yes	No	EC/KBC, 3AXIS , Accelerometer
PMV	1.2	No	No	No	North Bridge
USB0PS-E5V	5	Yes	Yes / No	No	USB Port0
USB1PS-E5V	5	Yes	Yes / No	No	USB Port1,3
PHY-P3V	3.3	No	No	No	IEEE1394
BT-P3V	3.3	No	No	No	Bluetooth
LAN-E3V	3.3	Yes	Yes / No	No	LAN
LAN2R5-E2V	2.5	Yes	Yes / No	No	LAN
P5V	5	No	No	No	South Bridge, ODD, SATA-HDD, PC-Card Power, LED, KB, PAD, Parallel, CRT, FAN, LCD power
E5V	5	Yes	Yes / No	No	USB Power, MDC

Table 1-8-2 Power supply output rating (ATI chipset model)(2/2)

Name	Power supply				
	Voltage[V]	Power OFF (Suspend mode)	Power OFF (Boot mode)	No battery	Object
M5V	5	Yes	Yes	No	LED
MCV	5	Yes	Yes	No	PSC
FL-P5V	5	No	No	No	FL-Inverter
PNL-P3V	3.3	No	No	No	LCD
DDC-P5V	5	No	No	No	CRT
IF-P5V	5	No	No	No	Docker
SND-P5V	5	No	No	No	AMP, Sound Power
MCVCCA-PYV	3.3	No	No	No	PC card
MCVPPA-PYV	5	No	No	No	PC card
A4R7-P4V	4.7	No	No	No	Sound CODEC, AMP
SP-P5V	5	No	No	No	PAD
R3V	2.0-3.5	Yes	Yes	Yes	RTC

1.7 Batteries

The computer has two types of batteries as follows:

- Main battery
- Real Time Clock (RTC) battery

The battery specifications are listed in Table 1-9.

Table 1-9 Battery specifications

Battery name		Material	Output voltage	Capacity
Main battery	G71C0004HC10/B10	Li-Ion	10.8 V	4,400 mAh
	G71C0002NC10/B10 G71C00036C10/B10	Li-Ion	10.8 V	3,600 mAh
RTC battery	GDM710000041 (Intel Chipset)	Ni-MH	2.4 V	16 mAh
	GDM710000045 (ATI Chipset)		3.6 V	16 mAh
	GDM710000046 (ATI Chipset)		3.6 V	16 mAh

1.7.1 Main Battery

The removable main battery pack is the computer's main power source when the AC adaptor is not attached. The main battery maintains the state of the computer when the computer enters in resume mode.

- Battery Charge

When the AC adapter is connected, normal charging is used while the system is turned on and quick charge is used while the system is turned off. Table 1-10 lists the charging time required for charges.

Table 1-10 Time required for charges

Battery type	Power on (hours)	Power off (hours)
Main battery (3,600 mAh)	About 4.5 to 10.0	About 3.0
Main battery (4,400 mAh)	About 5.5 to 12.0	About 3.0

Charge is stopped in the following cases.

1. The main battery is fully charged.
2. The main battery is removed.
3. Main battery or AC adapter voltage is abnormal.
4. Charging current is abnormal.

Data preservation time

When turning off the power in being charged fully, the preservation time is as following Table 1-11.

Table 1-11 Data preservation time

Battery type	Standby mode	Boot mode
Main battery (3,600 mAh)	5 days	65 days
Main battery (4,700 mAh)	6 days	80 days

1.7.2 RTC battery

The RTC battery provides power to keep the current date, time and other setup information in memory while the computer is turned off. Table 1-12 lists the charging time and data preservation period of the RTC battery.

Table 1-12 RTC battery charging/data preservation time

Status	Time
Charging Time (power on)	8 hours
Data preservation period (full charge)	30 days

1.8 AC Adapter

The AC adapter is used to charge the battery.

Table 1-13 lists the AC adapter specifications.

Table 1-13 AC adapter specifications

Parameter	Specification
	G71C0004A510(3-pin) / G71C0002SC10(2-pin)
Power	60W (Peak 75W)
Input voltage	100V/240V
Input frequency	50Hz to 60Hz
Input current	1.5A or less (100V-240V 4Aload)
Output voltage	15V
Output current	0A to 4A (At constant voltage mode)

Chapter 2

Troubleshooting Procedures

Chapter 2 Contents

2.1	Troubleshooting.....	2-1
2.2	Troubleshooting Flowchart	2-3
2.3	Power Supply Troubleshooting	2-7
2.4	System Board Troubleshooting	2-21
2.5	USB FDD Troubleshooting	2-45
2.6	HDD Troubleshooting	2-48
2.7	Keyboard and Touch pad Troubleshooting	2-53
2.8	Display Troubleshooting	2-56
2.9	Optical Drive Troubleshooting	2-58
2.10	Modem Troubleshooting	2-60
2.11	LAN Troubleshooting	2-62
2.12	Bluetooth Troubleshooting	2-63
2.13	Wireless LAN Troubleshooting	2-65
2.14	Sound Troubleshooting	2-67
2.15	SD card Slot Troubleshooting	2-70
2.16	Fingerprint sensor Troubleshooting	2-71

Figures

Figure 2-1	Troubleshooting flowchart	2-4
Figure 2-2	A set of tool for debug port test.....	2-24

Tables

Table 2-1	Battery icon	2-7
Table 2-2	DC IN icon	2-8
Table 2-3-1	Error code (in Intel chipset model)	2-9
Table 2-3-2	Error code (in ATI chipset model)	2-13
Table 2-4-1	Debug port (Boot mode) error status.....	2-25
Table 2-4-2	Debug port (Boot mode) error status.....	2-34
Table 2-5	FDD error code and status.....	2-46
Table 2-6	HDD error code and status	2-51

2.1 Troubleshooting

Chapter 2 describes how to determine if a Field Replaceable Unit (FRU) in the computer is causing the computer to malfunction. The FRUs covered are:

- | | | |
|--------------------------|------------------|------------------------|
| 1. Power Supply | 6. Display | 11. Wireless LAN |
| 2. System Board | 7. Optical Drive | 12. Sound components |
| 3. USB Floppy Disk Drive | 8. Modem | 13. SD card Slot |
| 4. Hard Disk Drive | 9. LAN | 14. Fingerprint sensor |
| 5. Keyboard/Touch pad | 10. Bluetooth | |

The Test Program operations are described in Chapter 3. Detailed replacement procedures are described in Chapter 4.

NOTE: Before replacing the system board, it is necessary to execute the subtest 03 DMI Information save of the 3.3 Setting of the hardware configuration in Chapter 3.

After replacing the system board, it is necessary to execute the subtest 04 DMI Information recovery and subtest 08 System configuration display of the 3.3 Setting of the hardware configuration in Chapter 3.

Also update with the latest EC/KBC as described in Appendix H “EC/KBC Rewrite Procedures”.

The implement for the Diagnostics procedures is referred to Chapter 3. Also, following implements are necessary:

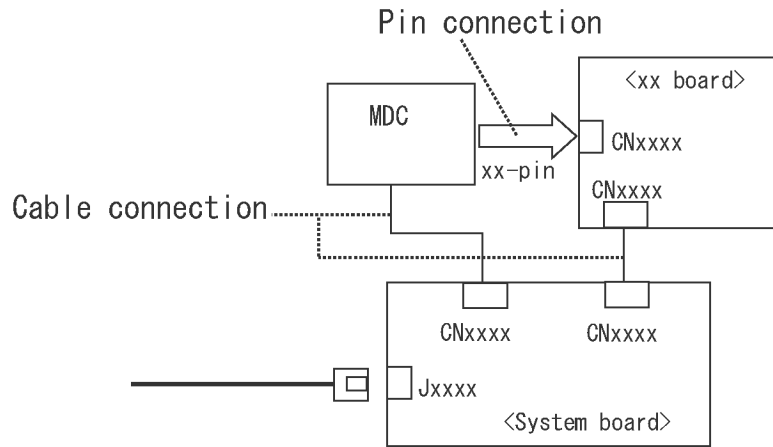
1. Phillips screwdrivers (For replacement procedures, Refer to Chapter 4)
2. Implements for debugging port check
 - Toshiba DOS system FD
 - RS-232C cross cable
 - Test board with debug port test cable
 - PC for displaying debug port test result

There are following two types of connections in the figure of board and module connection in and after 2.3 Power Supply Troubleshooting.

(1) Cable connection is described in the figure as line.

(2) Pin connection is described in the figure as arrow.

<e.g> Connection of modem



2.2 Troubleshooting Flowchart

Use the flowchart in Figure 2-1 as a guide for determining which FRU malfunctions. Before going through the flowchart steps, check the following:

- Ask the user if a password is registered and, if it is, ask him or her to enter the password.
- Make sure that Windows[®] XP preinstalled by Toshiba is installed on the hard disk. Operating systems not preinstalled by Toshiba can cause the computer malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the USB FDD (When connected to the computer) and optical drive are empty.

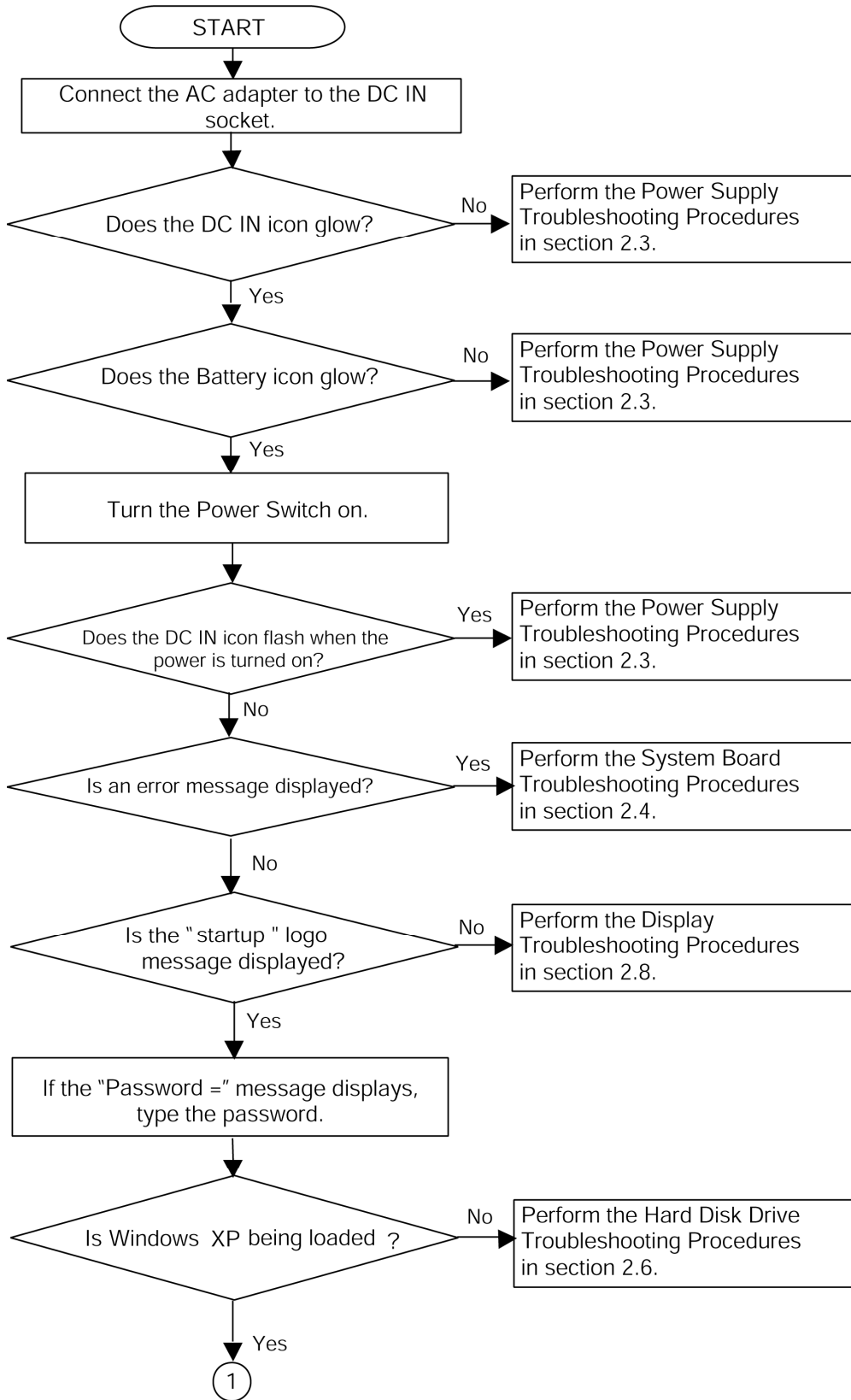


Figure 2-1 Troubleshooting flowchart (1/2)

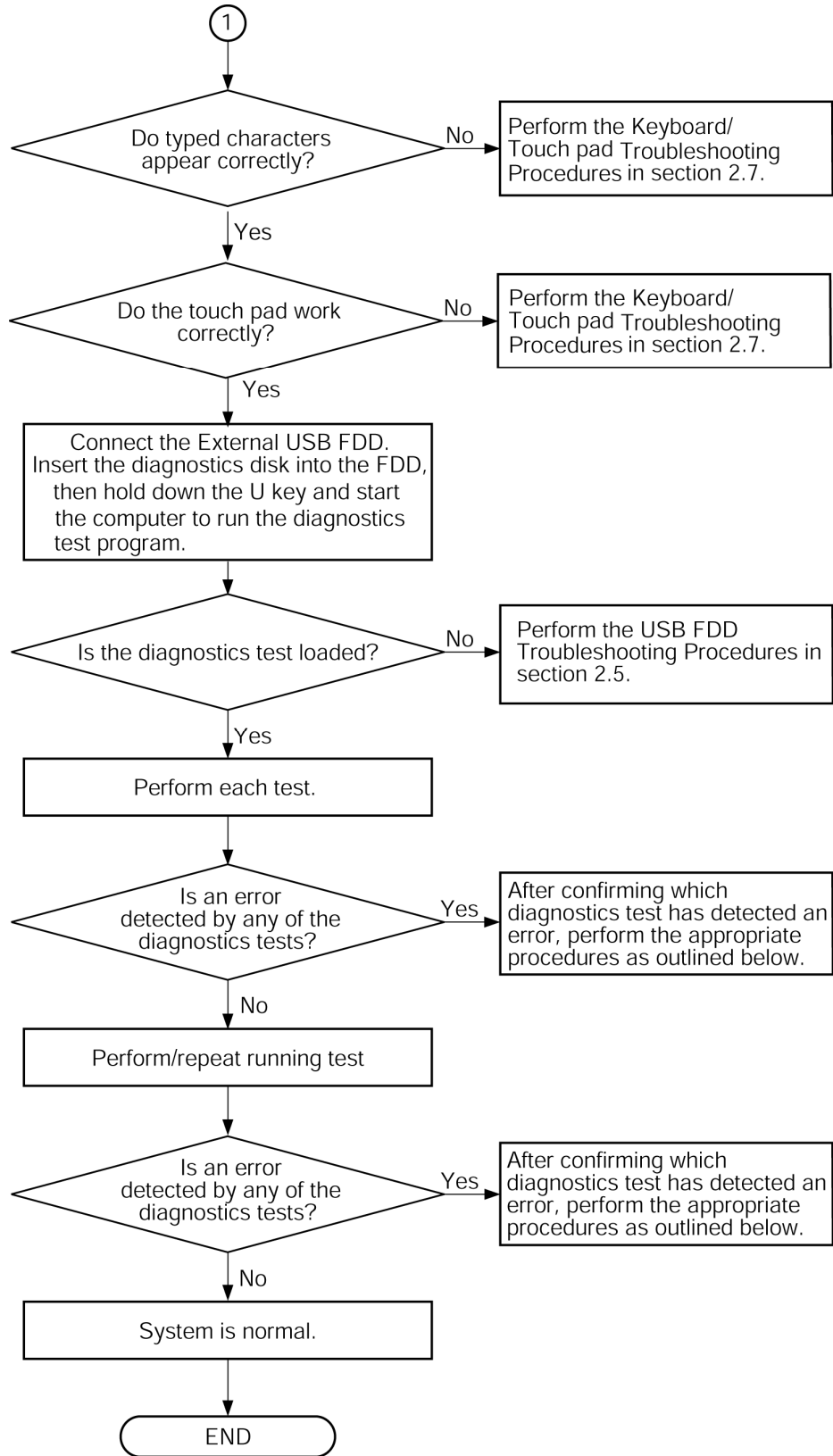


Figure 2-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The Running Test program should be executed several times to isolate the problem. Check the Log Utilities function to confirm which diagnostic test detected an error, then perform the appropriate troubleshooting procedures as follows:

1. If an error is detected on the system test, memory test, display test, CD-ROM/DVD-ROM test, expansion test, real timer test, Sound/LAN/Modem test, Bluetooth test or IEEE1394 test, perform the System Board Troubleshooting Procedures in Section 2.4.
2. If an error is detected on the floppy disk test, perform the USB FDD Troubleshooting Procedures in Section 2.5.
3. If an error is detected on the hard disk test, perform the HDD Troubleshooting Procedures in Section 2.6.
4. If an error is detected on the keyboard test (DIAGNOSTICS TEST) and pressed key display test (ONLY ONE TEST), perform the Keyboard/Touch pad Troubleshooting Procedures in Section 2.7.
5. If an error is detected on the display test, perform the Display Troubleshooting Procedures in Section 2.8.
6. If an error is detected on the CD-ROM/DVD-ROM test, perform the Optical Drive Troubleshooting Procedures in Section 2.9.
7. If an error is detected on the modem test, perform the Modem Troubleshooting Procedures in Section 2.10.
8. If an error is detected on the LAN test, perform the LAN Troubleshooting Procedures in Section 2.11.
9. If an error is detected on the Bluetooth test, perform the Bluetooth Troubleshooting Procedures in Section 2.12.
10. If an error is detected on the Wireless LAN test, perform the Wireless LAN Troubleshooting Procedures in Section 2.13.
11. If an error is detected on the Sound test, perform the Sound Troubleshooting Procedures in Section 2.14.
12. If a malfunction is detected on SD card, perform the SD card slot Troubleshooting Procedures in Section 2.15.
13. If a malfunction is detected on Fingerprint sensor, perform the Fingerprint sensor Troubleshooting Procedures in Section 2.16.

2.3 Power Supply Troubleshooting

The power supply controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The procedures described in this section are:

Procedure 1: Icons in the LCD Check

Procedure 2: Error Code Check

Procedure 3: Connection Check

Procedure 4: Charge Check

Procedure 5: Replacement Check

Procedure 1 Icons in the LCD Check

The following Icons in the LCD indicate the power supply status:

- Battery icon
- DC IN icon

The Power Supply Controller (PSC) displays the power supply status through the Battery icon and the DC IN icon in the LCD as listed in the tables below. To check the power supply status, install a battery pack and connect an AC adaptor.

Table 2-1 Battery icon

Battery icon	Power supply status
Lights orange	Battery is charged and the external DC is input. It has no relation with ON/OFF of the system power.
Lights green	Battery is fully charged and the external DC is input. It has no relation with ON/OFF of the system power.
Blinks orange (even intervals)	The battery level is low while the system power is ON.
Blinks orange once (at being switched on)	The system is driven by only a battery and the battery level is low.
Doesn't light	Any condition other than those above.

Table 2-2 DC IN icon

DC IN icon	Power supply status
Lights green	DC power is being supplied from the AC adapter.
Flashes orange	There is a problem with the power supply. *1
Doesn't light	Any condition other than those above.

*1 When the Power Supply Controller (PSC) detects a malfunction, the DC IN icon blinks orange. It shows an error code.

When the icon is blinking, perform the following procedure.

1. Remove the battery pack and the AC adapter.
2. Re-attach the battery pack and the AC adapter.

If the icon is still blinking after the operation above, check the followings:

Check 1 If the DC IN icon blinks orange, go to Procedure 2.

Check 2 If the DC IN icon does not light, go to Procedure 3.

Check 3 If the battery icon does not light orange or blue, go to Procedure 4.

NOTE: Use a supplied AC adapter G71C0004A510 (3-pin)/ G71C0002SC10 (2-pin).

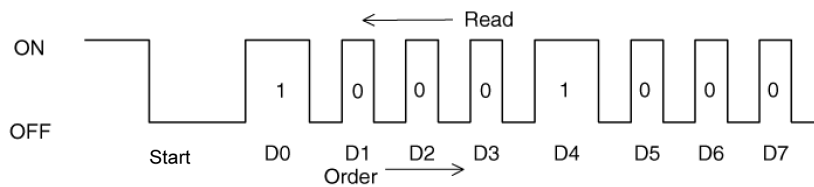
Procedure 2 Error Code Check

If the power supply microprocessor detects a malfunction, the DC IN icon blinks orange. The blink pattern indicates an error as shown below.

- Start Off for 2 seconds
- Error code (8 bit)
 - “1” On for one second
 - “0” On for half second
 - Interval between data bits Off for half second

The error code begins with the least significant digit.

Example: Error code 11h (Error codes are given in hexadecimal format.)



Check 1 Convert the DC IN icon blink pattern into the hexadecimal error code and compare it to the tables below. Then go to Check 2.

Table 2-3-1 Error code (in Intel chipset model)

Error code	Where Error occurs
1*h	AC Adaptor
2*h	1st Battery
3*h	2nd Battery
4*h	S3V output
5*h	E5V output
6*h	E3V output
7*h	1R5-E1V output
8*h	1R8-B1V output
9*h	PPV output
A*h	PTV output
B*h	1R5-E1V output
C*h	1R8-B1V output
D*h	PPV output
E*h	PTV output
F*h	-

AC Adaptor

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5V.
11h	CommonDock voltage is over 16.5V.
12h	Current from the DC power supply is over 7.00A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Correction value of 0[A] is out of designed value.

1st Battery

Error code	Meaning
22h	1st battery discharge current over 0.5A when there is no load.
23h	1st battery charge current is over 3.9A in charging.
24h	Correction value of 0[A] is out of designed value.
25h	1st battery charge current is over 0.3A in not charging.

2nd Battery

Error code	Meaning
32h	2nd battery discharge current is over 0.5A when there is no load.
33h	2nd battery charge current is over 3.9A in charging.
34h	Correction value of 0[A] is out of designed value.
35h	2nd battery charge current is over 0.3A in not charging.

S3V output

Error code	Meaning
40h	S3V voltage is 3.47V or less when the computer is powered on/off.
45h	S3V voltage is under 3.14V in normal conditions.
46h	S3V voltage is under 3.14V when the computer is booting up.

❑ E5V output

Error code	Meaning
50h	E5V voltage is over 6.00V when the computer is powered on/off.
51h	E5V voltage is under 4.50V when the computer is powered on.
52h	E5V voltage is under 4.50V when the computer is booting up.
54h	E5V voltage is under 4.50V when EV power is maintained and OUTV1=EV is designated.

❑ E3V output

Error code	Meaning
60h	E3V voltage is over 3.96V when the computer is powered on/off.
61h	E3V voltage is under 2.81V when the computer is powered on.
62h	E3V voltage is under 2.81V when the computer is booting up.
64h	E3V voltage is under 2.81 V when EV power is maintained.

❑ 1R5-E1V output

Error code	Meaning
70h	1R5-E1V voltage is over 1.80V when the computer is powered on/off.
71h	1R5-E1V voltage is under 1.275V when the computer is powered on.
72h	1R5-E1V voltage is under 1.275V when the computer is booting up.
74h	1R5-E1V voltage is under 1.275V when EV power is maintained and OUTV2=EV is designated.

❑ 1R8-B1V output

Error code	Meaning
80h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
81h	1R8-B1V voltage is under 1.53V when the computer is powered on.
82h	1R8-B1V voltage is under 1.53V when the computer is booting up.
84h	1R8-B1V voltage is under 1.53V when BV power is maintained and OUTV 4 =BV is designated.

PPV output

Error code	Meaning
90h	PPV voltage is over 1.80V when the computer is powered on/off.
91h	PPV voltage is under 0.32V when the computer is powered on.
92h	PPV voltage is under 0.32V when the computer is booting up.

PTV output

Error code	Meaning
A0h	PTV voltage is over 1.26V when the computer is powered on/off.
A1h	PTV voltage is under 0.89V when the computer is powered on.
A2h	PTV voltage is under 0.89V when the computer is booting up.

1R5-E1V output

Error code	Meaning
B0h	1R5-E1V voltage is over 1.80V when the computer is powered on/off.
B1h	1R5-E1V voltage is under 1.275V when the computer is powered on.
B2h	1R5-E1V voltage is under 1.275V when the computer is booting up.
B4h	1R5-E1V voltage is under 1.275V when EV power is maintained and OUTV7=EV is designated.

1R8-B1V output

Error code	Meaning
C0h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
C1h	1R8-B1V voltage is under 1.53V when the computer is powered on.
C2h	1R8-B1V voltage is under 1.53V when the computer is booting up.
C4h	1R8-B1V voltage is under 1.53V when BV power is maintained and OUTV8=BV is designated.

PPV output

Error code	Meaning
D0h	PPV voltage is over 1.80V when the computer is powered on/off.
D1h	PPV voltage is under 0.32V when the computer is powered on.
D2h	PPV voltage is under 0.32V when the computer is booting up.

❑ PTV output

Error code	Meaning
E0h	PTV voltage is over 1.26V when the computer is powered on/off.
E1h	PTV voltage is under 0.89V when the computer is powered on.
E2h	PTV voltage is under 0.89V when the computer is booting up.

❑ Miscellaneous

Error code	Meaning
F0h	The sub clock does not oscillate.

Table 2-3-2 Error code (in ATI chipset model)

Error code	Where Error occurs
1*h	AC Adaptor
2*h	1st Battery
3*h	2nd Battery
4*h	S3V output
5*h	E5V output
6*h	E3V output
7*h	PMV output
8*h	1R8-B1V output
9*h	PPV output
A*h	PTV output
B*h	PMV output
C*h	1R8-B1V output
D*h	PPV output
E*h	PTV output
F*h	-

Compare the patterns in the hexadecimal error code to the tables below.

AC Adaptor

Error code	Meaning
10h	AC Adaptor output voltage is over 16.5V.
11h	CommonDock voltage is over 16.5V.
12h	Current from the DC power supply is over 7.00A.
13h	Current from the DC power supply is over 0.5A when there is no load.
14h	Correction value of 0[A] is out of designed value.

1st Battery

Error code	Meaning
22h	1st battery discharge current over 0.5A when there is no load.
23h	1st battery charge current is over 4.3A in charging.
24h	Correction value of 0[A] is out of designed value.
25h	1st battery charge current is over 0.3A in not charging.

2nd Battery

Error code	Meaning
32h	2nd battery discharge current is over 0.5A when there is no load.
33h	2nd battery charge current is over 4.3A in charging.
34h	Correction value of 0[A] is out of designed value.
35h	2nd battery charge current is over 0.3A in not charging.

S3V output

Error code	Meaning
40h	S3V voltage is 3.47V or less when the computer is powered on/off.
45h	S3V voltage is under 3.14V in normal conditions.
46h	S3V voltage is under 3.14V when the computer is booting up.

E5V output

Error code	Meaning
50h	E5V voltage is over 6.00V when the computer is powered on/off.
51h	E5V voltage is under 4.50V when the computer is powered on.
52h	E5V voltage is under 4.50V when the computer is booting up.
54h	E5V voltage is under 4.50V when EV power is maintained and OUTV1=EV is designated.

E3V output

Error code	Meaning
60h	E3V voltage is over 3.96V when the computer is powered on/off.
61h	E3V voltage is under 2.81V when the computer is powered on.
62h	E3V voltage is under 2.81V when the computer is booting up.
64h	E3V voltage is under 2.81 V when EV power is maintained and OUTV2=EV is designated.

PMV output

Error code	Meaning
70h	PMV voltage is over 1.44V when the computer is powered on/off.
71h	PMV voltage is under 0.85V when the computer is powered on.
72h	PMV voltage is under 0.85V when the computer is booting up.

1R8-B1V output

Error code	Meaning
80h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
81h	1R8-B1V voltage is under 1.53V when the computer is powered on.
82h	1R8-B1V voltage is under 1.53V when the computer is booting up.
84h	1R8-B1V voltage is under 1.53V when BV power is maintained and OUTV 4 =BV is designated.

PPV output

Error code	Meaning
90h	PPV voltage is over 1.80V when the computer is powered on/off.
91h	PPV voltage is under 0.32V when the computer is powered on.
92h	PPV voltage is under 0.32V when the computer is booting up.

PTV output

Error code	Meaning
A0h	PTV voltage is over 1.26V when the computer is powered on/off.
A1h	PTV voltage is under 0.89V when the computer is powered on.
A2h	PTV voltage is under 0.89V when the computer is booting up.

PMV output

Error code	Meaning
B0h	PMV voltage is over 1.44V when the computer is powered on/off.
B1h	PMV voltage is under 0.85V when the computer is powered on.
B2h	PMV voltage is under 0.85V when the computer is booting up.
B4h	PMV voltage is under 0.85V when EV power is maintained and OUTV7=EV is designated.

1R8-B1V output

Error code	Meaning
C0h	1R8-B1V voltage is over 2.16V when the computer is powered on/off.
C1h	1R8-B1V voltage is under 1.53V when the computer is powered on.
C2h	1R8-B1V voltage is under 1.53V when the computer is booting up.
C4h	1R8-B1V voltage is under 1.53V when BV power is maintained and OUTV8=BV is designated.

PPV output

Error code	Meaning
D0h	PPV voltage is over 1.80V when the computer is powered on/off.
D1h	PPV voltage is under 0.32V when the computer is powered on.
D2h	PPV voltage is under 0.32V when the computer is booting up.

PTV output

Error code	Meaning
E0h	PTV voltage is over 1.26V when the computer is powered on/off.
E1h	PTV voltage is under 0.89V when the computer is powered on.
E2h	PTV voltage is under 0.89V when the computer is booting up.

Miscellaneous

Error code	Meaning
F0h	The sub clock does not oscillate.

Check 2 In the case of error code 10h or 12h:

- Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC IN 15 V socket and wall outlet. If the cables are connected correctly, go to the following step:
- Connect a new AC adaptor and/or AC power cord, if necessary. If the error still exists, go to Procedure 5.

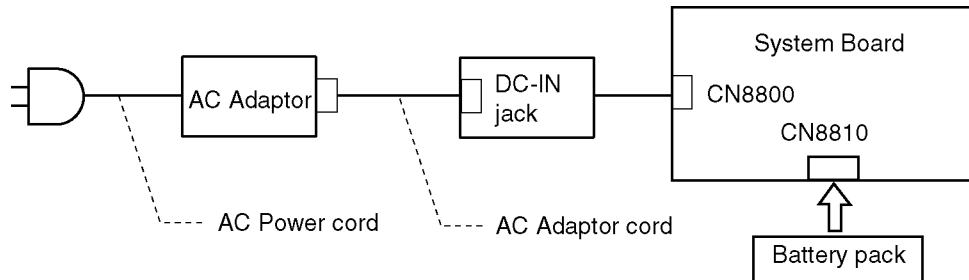
Check 3 In the case of error code 22h to 25h:

- Make sure the battery pack is correctly installed in the computer. If the battery pack is correctly installed, go to Procedure 3.

Check 4 For any other error, go to Procedure 5.

Procedure 3 Connection Check

The power supply wiring diagram is shown below:



Any of the connectors may be disconnected. Perform Check 1.

- Check 1 Disconnect the AC power cord from the wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.
- Check 2 Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC-IN jack socket and AC adaptor inlet/wall outlet, respectively. If these cables are connected correctly, go to Check 3.
- Check 3 Make sure the DC IN jack is firmly connected to the connector CN8800 on the system board.
- If the DC IN jack is not firmly connected, go to Procedure 1.
 - If it is connected, go to Check 4.
- Check 4 Use a multimeter to make sure the AC adaptor output voltage is close to 15 V. If the output is several percent lower than 15 V, go to Check 5. If the output is close to 15 V, go to Check 6.
- Check 5 Connect a new AC adaptor or AC power cord.
- If the DC IN icon does not light, go to Procedure 5.
 - If the battery icon does not light, go to Check 6.
- Check 6 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery icon still does not light, go to Procedure 4.

Procedure 4 Charge Check

- Check 1 Make sure the AC adaptor and AC power cord are firmly plugged into the DC IN socket and the wall outlet. If these cables are connected correctly, replace the AC adaptor (and/or AC power cord, if necessary).
- Check 2 Make sure the battery is properly installed. If the battery is properly installed, go to Check 3.
- Check 3 The battery pack may be completely discharged. Wait a few minutes to charge the battery pack. If the battery pack is still not charged, go to Check 4.
- Check 4 The battery's temperature is too hot or cold. Return the temperature to a normal operating condition. If the battery pack still is not charged, go to Check 5.
- Check 5 Replace the battery pack with a new one. If the battery pack still is not charged, go to Procedure 5.

Procedure 5 Replacement Check

The system board processor module may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*. Check the connection between the AC adaptor and system board and connection. After checking the connections, perform the following Check 1:

When AC adapter is connected:

Check 1 AC adapter may be faulty. Replace the AC adapter with a new one. If the problem still occurs, perform Check 2.

Check 2 System board may be faulty. Replace the system board with a new one.

When AC adapter is not connected:
(When driving with battery pack)

Check 1 Battery pack may be faulty. Replace it with a new one. If the problem still occurs, perform Check 2.

Check 2 System board may be faulty. Replace it with a new one.

2.4 System Board Troubleshooting

This section describes how to determine if the system board and CPU are defective or not functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

The procedures described in this section are:

Procedure 1: Message Check

Procedure 2: Debugging Port Check (Boot Mode)

Procedure 3: Diagnostic Test Program Execution Check

Procedure 4: Replacement Check

Procedure 1 Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. The IRT tests each IC on the system board and initializes it.

- If an error message is shown on the display, perform Check 1.
- If there is no error message, go to Procedure 2.
- If Windows XP is properly loaded, go to Procedure 3.

Check 1 If one of the following error messages appears on the screen, press **F1** as the message instructs. These errors occur when the system configuration preserved in the RTC memory (CMOS type memory) is not the same as the actual configuration or when the data is lost.

If you press **F1** as the message instructs, returns all system settings to their default values. Then the system reboots.

If error message (b) appears often when the power is turned on, replace the RTC battery. If any other error message displays, perform Check 2.

- (a) *** Bad HDD type ***
Check system. Then press [F1] key
- (b) *** RTC battery is low or CMOS checksum is inconsistent ***
Press [F1] key to set Date/Time
- (c) *** Bad configuration ***
Check system. Then press [F1] key
- (d) *** Bad memory size ***
Check system. Then press [F1] key
- (e) *** Bad time function ***
Check system. Then press [F1] key
- (g) *** Bad check sum (ROM) ***
Check system. Then press [F1] key

Check 2 If the following error message is displayed on the screen, press any key as the message instructs.
The following error message appears when data stored in RAM under the resume function is lost because the battery has become discharged or the system board is damaged. Go to Procedure 3.

```
WARNING: RESUME FAILURE.  
PRESS ANY KEY TO CONTINUE.
```

If any other error message displays, perform Check 3.

Check 3 The IRT checks the system board. When the IRT detects an error, the system stops or an error message appears.

If one of the following error messages (1) through (15), (20) or (21) appears, go to Procedure 4.

If the error message (16) appears, go to the Keyboard Troubleshooting Procedures in Section 2.7.

If the error message (17) or (18) appears, go to the HDD Troubleshooting Procedures in Section 2.6.

If the error message (19) appears, go to the Optical Drive Troubleshooting Procedures in Section 2.9.

- (1) PIT ERROR
- (2) MEMORY REFRESH ERROR
- (3) TIMER CH.2 OUT ERROR
- (4) FIRST 64KB MEMORY ERROR
- (5) FIRST 64KB MEMORY PARITY ERROR
- (6) VRAM ERROR
- (7) SYSTEM MEMORY ERROR
- (8) SYSTEM MEMORY PARITY ERROR
- (9) MEMORY ERROR
- (10) EXTENDED MEMORY PARITY ERROR
- (11) DMA PAGE REGISTER ERROR
- (12) DMAC #1 ERROR
- (13) DMAC #2 ERROR
- (14) PIC #1 ERROR
- (15) PIC #2 ERROR
- (16) KBC ERROR
- (17) HDC ERROR
- (18) Built-in HDD ERROR
- (19) CD-ROM ERROR
- (20) TIMER INTERRUPT ERROR
- (21) RTC UPDATE ERROR

Procedure 2 Debugging Port Check (Boot Mode)

Check the D port status by a debug port test. The tool for debug port test is shown below.

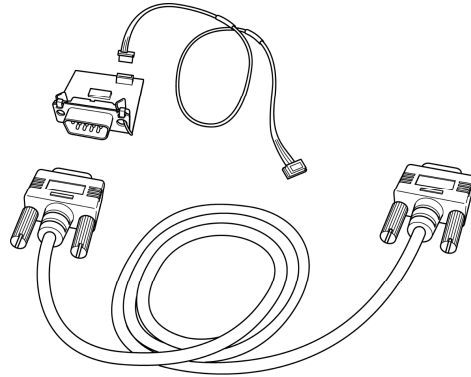
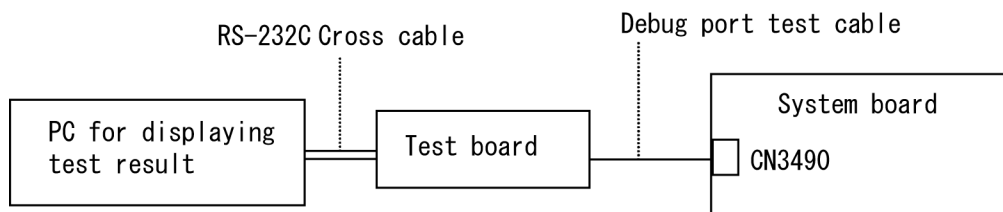


Figure 2-2 A set of tool for debug port test

The test procedures are follows:

1. Connect the debug port test cable to the connector CN3490 of the system board. For disassembling to connect the test cable, refer to Chapter 4.
2. Connect the debug port test cable and RS-232C cross-cable to the test board.
3. Connect the RS-232C Cross-cable to the PC that displays the test results.



4. Boot the computer in DOS mode.
5. Execute GETDPORT.COM in the text menu in CPU REAL mode. (Insert the FD for starting D port into FDD and input “FD starting drive:>dport”.)

The D port status is displayed in the following form;

F100 : 000.000382	IRT_CHK_INI\SYSI_START
D port status	Contents of process
Time (second) to process	

6. When the D port status is FFFF (normal status), go to Procedure 4. When the D port status falls into any other status than FFFF, go to Procedure 3.

[Intel chipset model]

Table 2-4-1 Debug port (Boot mode) error status (1/9)

D port status	Inspection items	Details
Boot block	Permission of A20 line and clear of software reset bit	
	Prohibition of APIC	
	Initialization of MCH and ICH	
	Initialization of Super I/O	
	Initialization of debug port	
	Dummy read of 3rd Bus data	
	Initialization of only PIT CH0	
	Setting of printer port (only for models supporting printer port)	
F000	(only for models supporting Super IO)	Only PIT CH0 initialization (for HOLD_ON) CHECK SUM CHECK Transition to protect mode
	(only for models supporting Super IO or not)	Boot block checksum (skip when returned to S3) (halts when error) Checksum other than boot block (skip when returned to S3)
F001	EC/KBC rewrite check	If "rewrite" is requested, go to "BIOS rewrite process"
F002	Initialization of SC	
	Key input (skip when returned to S3)	When a key pressed ,check the key (skip when returned to S3)
F005	Enables CPU cache	
F006	Security check	
	BIOS rewrite request check	If Checksum check error occurred on except Boot Block or rewrite is required by user, go to "BIOS rewrite process".
F007	Transits to System BIOS IRT	
	BIOS rewrite process	Initialization of ICHM. D31
		Configuration of DRAM
		Permission of cache (L1 cache only)
Memory clear		
F008	Transition to real mode and copy of BIOS to RAM	

Table 2-4-1 Debug port (Boot mode) error status (2/9)

D port status	Inspection items	Details	
F009	Saving key scan code		
	Setting of TASK_1ms_TSC		
	FAN control		
	Initialization of sound	Clears mute Sets the volume to max. (model controlling volume)	
	When request BIOS, EC/KBC rewriting	Blinks green (cycle:2s, on:1s, off:1s)	
	When BIOS renewal is prohibited	Blinks orange (cycle: 8s(On:4s,Off:4s), beeps for 30s and holts (DPORT=F00BH))	
	When BIOS ROM is abnormal	Blinks orange (cycle: 2s(On:1s,Off:1s))	
	Key input	Prohibition of USB Beep Waiting for key input	
	Reading CHGBIOSA.EXE / CHGFIRMA.EXE	FDC reset	
		Setting parameters for 2HD(1.44MB)	
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite.	
		Setting of parameters for 2DD (720KB)	
		Retrieval of "CHGBIOSA.EXE" from the root directory. Directory start header and calculates the sector Read 1 sector of the root directory Retrieval of entry of "CHGBIOSA.EXE" /"CHGFIRMA.EXE" from the sector read.	
Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE" Key input when error occurred			
Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"			
F100	Prohibition of cache		
	Permission of L1/L2 cache in Flash ROM area		
	Renewal of microcode		

Table 2-4-1 Debug port (Boot mode) error status (3/9)

D port status	Inspection items	Details
(F100)	Initialization of H/W (before DRAM recognition)	Initialization of MCH
		Initialization of ICH.D30.Func0
		Initialization of ICH.D31.Func0
		Initialization of ICH.D31.Func1
		Initialization of USB. Controller
		Initialization of ICH.D31.Func3
		Initialization of ICH Audio
	Initialization of TI controller	
	Initialization of PIT channel 1	(Setting the refresh interval to "30 μ s")
F101	Check of DRAM type and size (at cold boot)	When unsupported memory is connected, becoming HLT after beep sound (HLT when DRAM size is 0)
	SM-RAM stack area test	HLT When it can not be used as a stack
F102	Cache configuration	
	Cache permission (L1/L2 Cache)	
	CMOS access test (at cold boot)	(HLT when an error is detected)
	Battery level check of CMOS	
	CMOS checksum check	
	Initialization of CMOS data (1)	
	Setting of IRT status	(Setting of boot status and IRT busy flag, The rest bits are 0)
	Storing DRAM size in CMOS	
F103	Resume branch (at cold boot)	Not resume when a CMOS error occurred
		Not resume when resume status code is not set
		Resume error check S3 returning error (ICH) Resume error F17AH RSM_UNKNOWN_ERR SM-RAM checksum check Resume error F173H RSM_SMRAM_ERR RAM area checksum check in system BIOS Resume error F179H SM_RAMBIOS_ERR Expansion memory checksum check Resume error F176H RSM_EXTMEM_ERR PnP RAM checksum check Resume error F177H RSM_PNPRAM_ERR

Table 2-4-1 Debug port (Boot mode) error status (4/9)

D port status	Inspection items	Details
		Transition to RESUME-MAIN
	Resume error process	Reset of CPU clock to low
		Prohibition of all SMI
		Clearance of resume status
		Return to ROM
		Turning area of C0000h to EFFFFh to PCI (Prohibition of DRAM)
		Setting of resume error request
	Copying ROM/RAM of system BIOS	(HLT, when error occurs)
F104	Security check	
F105	SMRAM initialization	
	APIC initialization	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	
F106	Initialization of devices which need initialization before PCI bus initialization	PIT test (Cold boot only) and initialization
		Setting of test pattern to channel 0 of PIT#0
		Check whether the set test pattern can be read
		Initialization of PIT channel 0 (Setting of timer interruption interval to 55ms)
	Initialization of PIT channel 2 (Setting of the sound generator frequency to 664Hz)	
	Test of PIT channel 1 (Check whether the refresh signal works normally in 30 micro-s refresh interval) HLT, when the time is out	
	Test of PIT channel 2 (Check whether the speaker gate works normally)	
	CPU clock measurement	
	Check of parameter block A	
	Permission of SMI except auto-off function	
	Judgment of destination (country) from DMI data	

Table 2-4-1 Debug port (Boot mode) error status (5/9)

D port status	Inspection items	Details	
(F106)	Check of CMOS default check	(When there is bad battery or bad checksum (ROM,CMOS), executes default setting.)	
	Control of over input power		
	Control of battery discharge current (1CmA)		
	Control of over current of AC adaptor		
	Execution of the dividing process for measuring IRT time		
	Setting of clock generator		
	Initialization of CPU		
F107	Saving memory configuration to buffer		
	Reading of EC version		
	Update of flash ROM type		
	Initialization of ACPI table	(for execution of option ROM)	
	Initialization of devices which need initialization before PCI bus initialization	Setting the operation mode of IDE device	
		Setting the operation mode AC97'/Azaria and control of AC97'	
		Initialization of temperature control information	
		KBC initialization	
		VGA display off, Reset control	
		Control of built-in LAN permission/prohibition	
		Initialization of PCI Express	
		Sound initialization	
		PC multi-box status acquisition (model supporting select bay)	
		HC initialization, device connection recognition	
	Recognition of SD memory card and initialization		
Initialization of PIC			
Test of PIC			
Initialization of Password			
F108	PCI bus initialization		
	Initialization of LAN information		
	Check of WakeUp factor		

Table 2-4-1 Debug port (Boot mode) error status (6/9)

D port status	Inspection items	Details
F109	Task generation for waiting INIT_PCI completion	
	Initialization of SVP (model supporting SVP)	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup items	
	Waiting for the completion of Multi-box status check	
	H/W setting based on resource	
F10A	Task generation for waiting PnP resource making completion	
	PnP H/W initialization	PC card slot initialization
		SIO initialization (for models supporting SIO)
		FIR initialization (for models supporting FIR)
	PCI automatic configuration	Making of work for automatic configuration
		Acquisition of PCI IRQ
		Configuration
Saving the result of configuration		
F10B	Task generation for waiting PCI_CONFIGURATION completion	
	Initialization of H/W necessary after PCI configuration	Printer port setting (for models supporting printer)
		HDD initialization sequence start
		FDD initialization sequence start (for models supporting printer internal FDD)
	Enabling power off	
Output code generation		
F10C	FIRST_64KB_CHECK	(Check of first 64KB memory)
F10D	INIT_INT_VECTOR	(Initialization of vectors)
F10E	INIT_NDP	(Initialization of NDP)
F10F	INIT_SYSTEM (Initialization of system)	Storing of CMOS error status to IRT_ERR_STS_BUF

Table 2-4-1 Debug port (Boot mode) error status (7/9)

D port status	Inspection items	Details
(F10F)		Control of CD POWER SW (model supporting CD Play)
		Timer initialization start
		EC initialization & Reading of battery information
		Update of system BIOS (Update of EDID information for LCD)
F110	Waiting for VGA chip initialization completion, VGA BIOS initialization	Waiting VGA power on
		Waiting completion of display access
F111	Call VGA BIOS	
F113	DISP_LOGO (Displaying logo)	Start of waiting logo display DPORT=F125
F114	SYS_MEM_CHECK	(Check of convention memory)(Boot)
F115	EXT_MEM_CHECK	(Check of exception in the protected mode)(Boot)
	Exception check in the protected mode	Dport=F117h when error occurs
F116	INIT_SYS_MEM	Initialization of conventional memory (Reboot)
F118	CHK_DMA_PAGE	(Check of DMA Page Register) (Boot)
F119	CHECK_DMAC	(Initialization of DMAC) (Boot)
F11A	INIT_DMAC	(Initialization of DMAC) (Boot)
F11B	CHECK_PRT	(Check of printer existence) (For models supporting Printer port)
F11C	CHECK_SIO	(Check of SIO) (model supporting SIO)
F11D	Displaying the result of DIAGNOSTIC	(When the DIAGNOSTIC mode is permitted)
F11E	BOOT_PASSWORD (Check of password)	Waiting for FDD initialization completion in Reboot mode (model with built-in FDD)
		Waiting for HDD initialization completion
		Check of key input during IRT (waiting for KBC initialization completion)
		I/O LOCK process (model supporting I/O LOCK)
		Initialization of ATA priority in Boot mode
		Key input check during IRT (waiting here completion of KBC initialization)
		Input password (Waiting completion of HDD initialization)
		I/O LOCK process (model supporting I/O LOCK)

Table 2-4-1 Debug port (Boot mode) error status (8/9)

D port status	Inspection items	Details
(F11E)		Initialization of TPM (model supporting TPM)
F11F	EX_IO_ROM_CHECK	(Option I/O ROM check)
F120	PRE_BOOT_SETUP	Saving of value in 40:00h (for SIO saving/restoring)
		Setting of font address for resume password
		Setting of repeat parameter for USB KB
		Final check of key input during IRT
		Storing of T_SHADOW_RAM_SIZE
		Update of system resource just before booting
		Rewriting of memory map data of INT15h E820h function
		Waiting for AC-Link initialization completion
		Renewal of table for DMI
		Copying ACPI table to uppermost of extension memory
		Waiting for completion of writing the PSC version to BIOS
		Waiting for completion of setting clock generator When error occurred, halt at F121 IRT_CLOCK_GENERATOR_ERR
		Waiting for completion of initialization of Serial port (for models supporting SIO)
		Cancel of NMI Mask
		TIT check sum
		Clear of the IRT flag of Runtime side
		Update of check sum of Runtime side
		Hibernation branch (for models supporting BIOS Hibernation)
		Initialization of Bluetooth (for models supporting Bluetooth)
		Check for existence of target maintenance card
		Prohibition of unused PC card not used
		Setting Wakeup status data for ACPI

Table 2-4-1 Debug port (Boot mode) error status (9/9)

D port status	Inspection items	Details
(F120)		<p>Initialization of HW just before BOOT and waiting the completion</p> <p>Notifies the DVI connection status to VGA BIOS (models supporting DVI)</p> <p>Setting of battery save mode</p> <p>Setting of date</p> <p>Waiting for Bluetooth initialization completion (models supporting Bluetooth)</p> <p>Update of DMI Wakeup factor, Update of SM-BIOS structure table</p> <p>PCI device configuration space close</p> <p>Cache control</p> <p>Process for CPU</p> <p>Make the CPU clock to be set by SETUP</p> <p>Waiting of motor-off completion of disabled HDD</p> <p>Final decision of USB FDD drive information</p> <p>Post processing of PRE_BOOT_SETUP</p> <p>Clear of PWRBTN_STS</p> <p>Enabling POWER Button</p>
F122	Initialization of SC	
F124	Clears IRT status Renewal of checksum of Runtime side.	
FFFF		

[ATI chipset model]

Table 2-4-2 Debug port (Boot mode) error status (1/9)

D port status	Inspection items	Details
Boot block	Permission of A20 line and clear of software reset bit	
	Prohibition of APIC	
	Initialization of North Bridge and South Bridge	
	Initialization of Super I/O	
	Initialization of debug port	
	Dummy read of EC 3rd Bus data	
	Initialization of only PIT CH0	
	Setting of printer port (only for models supporting printer port)	
	CHECK SUM CHECK	
	Transition to Protect mode	
F000	Boot block checksum (skip when returned to S3)	(halts, when error)
	Checksum other than boot block (skip when returned to S3)	
F001	EC/KBC rewrite check	If "rewrite" is requested, go to "BIOS rewrite process"
F002	Initialization of SC	When error, halts. DPORT=F003H or F004H
	Key input (skip when returned to S3)	When a key pressed ,check the key (skip when returned to S3)
F005	Enables CPU cache	
F006	Security check	
	BIOS rewrite request check	If Checksum check error occurred on except Boot Block or rewrite is required by user, go to "BIOS rewrite process".
F007	Transits to System BIOS IRT	
	BIOS rewrite process	Initialization of South Bridge
		Configuration of DRAM
		Permission of cache (L1 cache only)
		Memory clear
	Transition to real mode and copy of BIOS to RAM	

Table 2-4-2 Debug port (Boot mode) error status (2/9)

D port status	Inspection items	Details	
F009	Saving key scan code		
	Setting of TASK_1ms_TSC		
	FAN control		
	Initialization of sound	Clears mute	
	When request BIOS, EC/KBC rewriting	Blinks green (cycle:2s, on:1s, off:1s)	
	When BIOS renewal is prohibited	Blinks orange (cycle: 8s(On:4s,Off:4s), beeps for 30s and holts (DPORT=F00BH))	
	When BIOS ROM is abnormal	Blinks orange (cycle: 2s(On:1s,Off:1s))	
	Key input	Prohibition of USB	
		Beep Waiting for key input	
	Reading CHGBIOSA.EXE / CHGFIRMA.EXE	FDC reset	
		Setting parameters for 2HD(1.44MB)	
		Reading of first sector, If it is the data of 1.44MB (2HD), the media type is definite.	
		Setting of parameters for 2DD (720KB)	
		Retrieval of "CHGBIOSA.EXE" from the root directory. Directory start header and calculates the sector Read 1 sector of the root directory Retrieval of entry of "CHGBIOSA.EXE" /"CHGFIRMA.EXE" from the sector read.	
Reading of EXE header of "CHGBIOSA.EXE" and "CHGFIRMA.EXE" Key input when error occurred			
Execution of "CHGBIOSA.EXE" and "CHGFIRMA.EXE"			
F100	Prohibition of cache		
	Permission of L1/L2 cache in Flash ROM area		
	Renewal of microcode		

Table 2-4-2 Debug port (Boot mode) error status (3/9)

D port status	Inspection items	Details
(F100)	Initialization of H/W (before DRAM recognition)	Initialization of North Bridge
		I Initialization of South Bridge
Initialization of GPIO		
Initialization of TI controller		
	Initialization of PIT channel 1	(Setting the refresh interval to "30μs")
F101	Check of DRAM type and size (at cold boot)	When unsupported memory is connected, becoming HLT after beep sound HLT when DRAM size is 0
	SM-RAM stack area test	HLT When it can not be used as a stack
F102	Cache configuration	
	Cache permission (L1/L2 Cache)	
	CMOS access test (at cold boot)	(HLT when an error is detected)
	Battery level check of CMOS	
	CMOS checksum check	
	Initialization of CMOS data (1)	
	Setting of IRT status	(Setting of boot status and IRT busy flag, The rest bits are 0)
	Storing DRAM size	
F103	Resume branch (at cold boot)	Not resume when a CMOS error occurred
		Not resume when resume status code is not set
		Resume error check S3 returning error (South Bridge) Resume error F17AH RSM_UNKNOWN_ERR SM-RAM checksum check Resume error F173H RSM_SMRAM_ERR RAM area checksum check in system BIOS Resume error F179H SM_RAMBIOS_ERR Expansion memory checksum check Resume error F176H RSM_EXTMEM_ERR PnP RAM checksum check Resume error F177H RSM_PNPRAM_ERR

Table 2-4-2 Debug port (Boot mode) error status (4/9)

D port status	Inspection items	Details
(F103)		Transition to RESUME-MAIN
	Resume error process	Reset of CPU clock to low
		Prohibition of all SMI
		Clearance of resume status
		Return to ROM
		Turning area of C0000h to EFFFFh to PCI (Prohibition of DRAM)
		Setting of resume error request
Copying ROM/RAM of system BIOS	(HLT, when error occurs)	
F104	Security check	
F105	SMRAM initialization	
	APIC initialization	
	WakeUp factor check	
	SMRAM base rewriting and CPU state map saving for BIOS	
	Permission of SMI based on ASMI	
F106	Initialization of devices which need initialization before PCI bus initialization	Initialization of PCI Express
		Setting of test pattern to channel 0 of PIT#0
		Check whether the set test pattern can be read
		Initialization of PIT channel 0 (Setting of timer interruption interval to 55ms)
	Initialization of PIT channel 2 (Setting of the sound generator frequency to 664Hz)	
	Test of PIT channel 1 (Check whether the refresh signal works normally in 30 micro-s refresh interval) HLT, when the time is out	
	Test of PIT channel 2 (Check whether the speaker gate works normally)	
	CPU clock measurement	
	Check of parameter block A	
	Permission of SMI except auto-off function	
	Judgment of destination (country) from DMI data	

Table 2-4-2 Debug port (Boot mode) error status (5/9)

D port status	Inspection items	Details	
(F106)	Check of CMOS default check	(When there is bad battery or bad checksum (ROM, CMOS), executes default setting.)	
	Control of over input power		
	Control of battery discharge current (1CmA)		
	Control of over current of AC adaptor		
	Execution of the dividing process for measuring IRT time		
	Setting of clock generator		
	Initialization of CPU		
F107	Saving memory configuration to buffer		
	Reading of EC version		
	Update of flash ROM type		
	Initialization of ACPI table	(for execution of option ROM)	
	Initialization of devices which need initialization before PCI bus initialization	Permission of PCI Arbitration	
		Initializing of Chipset A-LINK	
		Setting of operation mode of IDE device	
		Setting the operation mode AC97'/Azaria and control of AC97'	
		Initialization of temperature control information	
		KBC initialization	
		VGA display off, Reset control	
		Control of built-in LAN permission/prohibition	
		Initialization of PCI Express	
		Sound initialization	
PC multi-box status acquisition (model supporting select bay)			
HC initialization, device connection recognition			
Recognition of SD memory card and initialization			
F108	PCI bus initialization		
	Initialization of LAN information		
	Check of WakeUp factor		

Table 2-4-2 Debug port (Boot mode) error status (6/9)

D port status	Inspection items	Details
F109	Task generation for waiting INIT_PCI completion	
	Initialization of SVP (model supporting SVP)	
	CMOS data initialization (2)	
	PnP initialization	
	Setting of setup items	
	Waiting for the completion of Multi-box status check	
	H/W setting based on resource	
F10A	Task generation for waiting PnP resource making completion	
	PnP H/W initialization	PC card slot initialization
		SIO initialization (for models supporting SIO)
		FIR initialization (for models supporting FIR)
	PCI automatic configuration	Making of work for automatic configuration
		Acquisition of PCI IRQ
		Configuration
Saving the result of VGA configuration		
F10B	Task generation for waiting PCI_CONFIGURATION completion	
	Initialization of H/W necessary after PCI configuration	Printer port setting (for models supporting printer)
		HDD initialization sequence start
		FDD initialization sequence start (for models supporting printer internal FDD)
	Enabling power off	
Output code generation		
F10C	FIRST_64KB_CHECK	(Check of first 64KB memory)
F10D	INIT_INT_VECTOR	(Initialization of vectors)
F10E	INIT_NDP	(Initialization of NDP)
F10F	INIT_SYSTEM (Initialization of system)	Storing of CMOS error status to IRT_ERR_STS_BUF

Table 2-4-2 Debug port (Boot mode) error status (7/9)

D port status	Inspection items	Details
(F10F)		Timer initialization start
		EC initialization & Reading of battery information
		Update of system BIOS (Update of EDID information for LCD)
F110	Waiting for VGA chip initialization completion, VGA BIOS initialization	Waiting VGA power on
		Waiting completion of display access
F111	Call VGA BIOS	
F113	DISP_LOGO (Displaying logo)	Start of waiting logo display DPORT=F125 (not used)
F114	SYS_MEM_CHECK	(Check of convention memory)(Boot)
F115	EXT_MEM_CHECK	(Check of exception in the protected mode)(Boot)
	Exception check in the protected mode	DPORT=F117h when error occurs
F116	INIT_SYS_MEM	Initialization of conventional memory (Reboot)
F118	CHK_DMA_PAGE	(Check of DMA Page Register) (Boot)
F119	CHECK_DMACH	(Initialization of DMACH) (Boot)
F11A	INIT_DMACH	(Initialization of DMA) (Boot)
F11B	CHECK_PRT	(Check of printer existence) (For models supporting Printer port)
F11C	CHECK_SIO	(Check of SIO) (model supporting SIO)
F11D	Displaying the result of DIAGNOSTIC	(When the DIAGNOSTIC mode is permitted)
F11E	BOOT_PASSWORD (Check of password)	Waiting for FDD initialization completion in Reboot mode (model with built-in FDD)
		Waiting for HDD initialization completion
		Check of key input during IRT (waiting for KBC initialization completion)
		I/O LOCK process (model supporting I/O LOCK)
		Initialization of ATA priority in Boot mode
		Key input check during IRT (waiting here completion of KBC initialization)
		Input password (Waiting completion of HDD initialization)
I/O LOCK process (model supporting I/O LOCK)		

Table 2-4-2 Debug port (Boot mode) error status (8/9)

D port status	Inspection items	Details
(F11E)		Initialization of TPM (model supporting TPM)
F11F	EX_IO_ROM_CHECK	(Option I/O ROM check)
F120	PRE_BOOT_SETUP	Saving of value in 40:00h (for SIO saving/restoring)
		Setting of font address for resume password
		Setting of repeat parameter for USB KB
		Final check of key input during IRT
		Storing of T_SHADOW_RAM_SIZE
		Update of system resource just before booting
		Rewriting of memory map data of INT15h E820h function
		Renewal of table for DMI
		Setting parts information
		Copying ACPI table to uppermost of extension memory
		Waiting for completion of writing PSC version to BIOS
		Waiting for completion of setting clock generator When error occurred, halt at F121 IRT_CLOCK_GENERATOR_ERR
		Waiting for completion of initialization of Serial port (for models supporting SIO)
		Cancel of NMI Mask
		TIT check sum
		Clear of the IRT flag of Runtime side
		Update of check sum of Runtime side
		Hibernation branch (for models supporting BIOS Hibernation)
		Initialization of Bluetooth (for models supporting Bluetooth)
		Check for existence of target maintenance card
		Prohibition of unused PC card not used
		Setting Wakeup status data for ACPI

Table 2-4-2 Debug port (Boot mode) error status (9/9)

D port status	Inspection items	Details
(F120)		Initialization of HW just before BOOT and waiting the completion Notifies the DVI connection status to VGA BIOS (models supporting DVI) Setting of battery save mode Setting of date Waiting for Bluetooth initialization completion (models supporting Bluetooth) Update of DMI Wakeup factor, Update of SM-BIOS structure table PCI device configuration space close Cache control Process for CPU Make the CPU clock to be set by SETUP Waiting of motor-off completion of disabled HDD Final decision of USB FDD drive information Post processing of PRE_BOOT_SETUP Initializing PCI Express device (2) Clear of PWRBTN_STS Enabling POWER Button
F122	Initialization of SC	
F124	Clears IRT status Renewal of checksum of Runtime side.	
FFFF		

NOTE: Status outputted by the test means the last error detected in the debug port test.

Procedure 3 Diagnostic Test Program Execution Check

Execute the following tests from the Diagnostic Test Menu. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform these tests.

1. System test
2. Memory test
3. Keyboard test
4. Display test
5. Floppy Disk test
6. Async test
7. Hard Disk test
8. Real Timer test
9. NDP test
10. Expansion test
11. CD-ROM/DVD-ROM test
12. Only One test
13. Wireless LAN test
14. Sound test
15. LAN/Modem/Bluetooth/IEEE1394 test

If an error is detected during these tests, go to Procedure 4.

Procedure 4 Replacement Check

The system board connectors may be faulty. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and replace it.

2.5 USB FDD Troubleshooting

This section describes how to determine if the USB FDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: USB FDD Head Cleaning Check

Procedure 2: Diagnostic Test Program Execution Check

Procedure 3: Connector Check and Replacement Check

Procedure 1 USB FDD Head Cleaning Check

USB FDD head cleaning operation details are given in Chapter 3, *Tests and Diagnostics*.

Connect a USB floppy disk drive to a computer and insert the Diagnostics Disk in the USB floppy disk drive, turn on the computer and run the test. Clean the USB FDD heads using the cleaning kit. If the USB FDD still does not function properly after cleaning, go to Procedure 2.

If the test program cannot be executed, go to Procedure 3.

Procedure 2 Diagnostic Test Program Execution Check

Insert the Diagnostics Disk in the USB FDD, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

Floppy disk drive test error codes and their status names are listed in Table 2-5. Make sure the floppy disk is formatted correctly and that the write protect tab is disabled. If any other errors occur while executing the FDD diagnostics test, go to Check 1.

Table 2-5 FDD error code and status

Code	Status
01h	Bad command error
02h	Address mark not found
03h	Write protected
04h	Record not found
06h	Media removed
08h	DMA overrun error
09h	DMA boundary error
10h	CRC error
20h	FDC error
40h	Seek error
60h	Not drive error
80h	Time out error
EEh	Write buffer error
FFh	Data compare error

Check 1 If the following message appears, disable the write protect tab on the floppy disk. If any other message appears, perform Check 2.

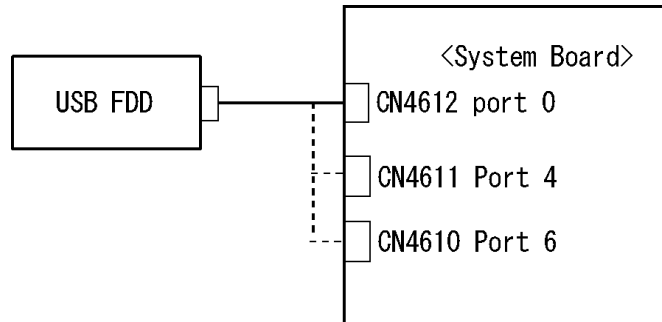
Write protected

Check 2 Make sure the floppy disk is formatted correctly. If it is, go to Procedure 3.

Procedure 3 Connector Check and Replacement Check

The USB FDD is connected to the System Board.

- Check 1 When using the USB port, make sure the USB FDD cable is firmly connected to CN4612, CN4611 or CN4610 on the System.



If any of the connections are loose, reconnect firmly and repeat Procedure 2.
If any of the connections is damaged, or there is still an error, go to Check 2.

- Check 2 The USB FDD or USB FDD cable may be defective or damaged. Replace it with a new one. If the USB FDD is still not functioning properly, perform Check 3.
- Check 3 Replace the System board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.6 HDD Troubleshooting

This section describes how to determine if the HDD is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Partition Check

Procedure 2: Message Check

Procedure 3: Format Check

Procedure 4: Diagnostic Test Program Execution Check

Procedure 5: Connector Check and Replacement Check

CAUTION: *The contents of the hard disk will be erased when you execute the HDD troubleshooting procedures. Transfer the contents of the hard disk to floppy disks or other storage media.*

Procedure 1 Partition Check

Insert the Toshiba DOS system disk and restart the computer with U key holding down. Perform the following checks:

- Check 1 Type C: and press **Enter**. If you cannot change to drive C, go to Check 2. If you can change to drive C, go to Procedure 2.
- Check 2 Type **FDISK** and press **Enter**. Choose Display Partition Information from the FDISK menu. If drive C is listed, go to Check 3. If drive C is not listed, return to the FDISK menu and choose the option to create a DOS partition on drive C. Restart the computer from the Toshiba DOS system disk. If the problem still exists, go to Procedure 2.
- Check 3 If drive C is listed as active in the FDISK menu, go to Check 4. If drive C is not listed as active, return to the FDISK menu and choose the option to set the active partition for drive C. Restart the computer and then go to Procedure 2.
- Check 4 Remove the FD and restart the computer. If the problem still exists, go to Procedure 2.

Procedure 2 Message Check

When the power is turned on, the system performs the Initial Reliability Test (IRT) installed in the BIOS ROM. When the test detects an error, an error message is displayed on the screen.

Make sure no floppy disk is in the USB FDD. Turn on the computer and check the message on the screen. When an OS starts from the 2.5" HDD, go to Procedure 3. Otherwise, start with Check 1 below and perform the other checks as instructed.

Check 1 If any of the following messages appear, go to Procedure 3. If the following messages do not appear, perform Check 2.

Built-in HDD ERROR (After 5 seconds this message will disappear.)

or

CD-ROM ERROR (After 5 seconds this message will disappear.)

Check 2 If either of the following messages appears, go to Check 3. If the following messages do not appear, perform Check 5.

Insert system disk in drive
Press any key when ready

or

Non-System disk or disk error
Replace and press any key when ready

Check 3 Using the SYS command of the DOS, transfer the system to the 2.5" HDD. If the system is not transferred, go to Procedure 3. Refer to the DOS Manual for detailed operation.

If the following message appears on the display, the system program has been transferred to the HDD.

System Transferred

If an error message appears on the display, perform Check 5.

Check 4 2.5" HDD(s) and the connector(s) of system board may be defective (Refer to the steps described in Chapter 4, *Replacement Procedures* for disassembling.). Insert HDD(s) to the connector(s) firmly. If it is (or they are) firmly connected, go to Procedure 3.

Procedure 3 Format Check

The computer's HDD is formatted using the DOS FORMAT program or the physical format program of the test program. To format the HDD, start with Check 1 below and perform the other steps as required.

Refer to the DOS Manual for the operation of DOS. For the format by the test program, refer to the Chapter 3.

Check 1 Format the 2.5" HDD using DOS FORMAT command. Type as **FORMAT C: / S/U**.

 If the 2.5" HDD can not be formatted, perform Check 2.

Check 2 Using the DOS FDISK command, set the 2.5" HDD partition. If the partition is not set, go to Check 3. If it is set, format the 2.5" HDD using DOS FORMAT command.

Check 3 Using the Diagnostic Disk, format the 2.5" HDD with a format option (physical format). If HDD is formatted, set the 2.5" HDD partition using DOS FDISK command.

 If you cannot format the 2.5" HDD using the Tests and Diagnostic program, go to Procedure 4.

Procedure 4 Diagnostic Test Program Execution Check

The HDD test program is stored in the Diagnostics Disk. Perform all of the HDD tests in the Hard Disk Drive Test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the HDD test program.

If an error is detected during the HDD test, an error code and status will be displayed. Replace the HDD with a new one following the instructions in Chapter 4, *Replacement Procedures*. The error codes and statuses are listed in Table 2-6. If an error code is not generated or the problem still exists, go to Procedure 5.

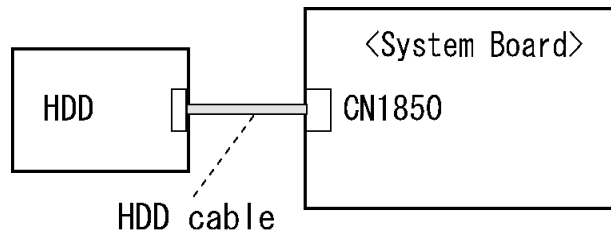
Table 2-6 HDD error code and status

Code	Status
01h	Bad command error
02h	Address mark not found
04h	Record not found
05h	HDC not reset
07h	Drive not initialized
08h	Overrun error (DRQ)
09h	DMA boundary error
0Ah	Bad sector error
0Bh	Bad track error
10h	ECC error
11h	ECC recover enable
12h	DMA CRC error
20h	HDC error
40h	Seek error
80h	Time out error
AAh	Drive not ready
BBh	Undefined error
CCh	Write fault
E0h	Status error
EEh	Access time error
DAh	No HDD

Procedure 5 Connector Check and Replacement Check

The HDD may be disconnected, or the HDD, HDD cable or system board may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the HDD is firmly connected to CN1850 on the system board.



If any of the connections are loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2 The HDD may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

Check 3 The System board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.7 Keyboard and Touch pad Troubleshooting

To determine if the computer's keyboard or touch pad is functioning properly, perform the following procedures. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

Execute the Keyboard Test in the Diagnostic Program. Refer to Chapter 3, *Tests and Diagnostics*, for more information on how to perform the test program.

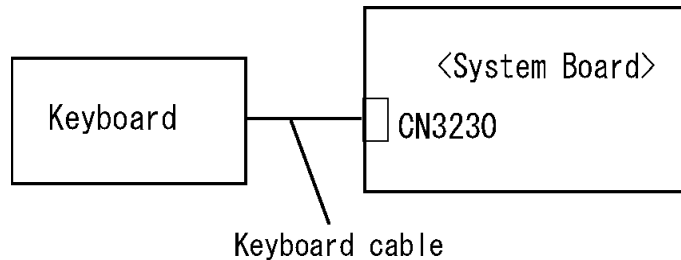
If an error occurs, go to Procedure 2. If an error does not occur, the keyboard is functioning properly.

Procedure 2 Connector Check and Replacement Check

The keyboard, touch pad or sensor/switch board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

1. If the keyboard malfunctions, start with Check 1.
2. If the touch pad malfunctions, start with Check 3.
3. If the SW membrane malfunctions, start with Check 6.

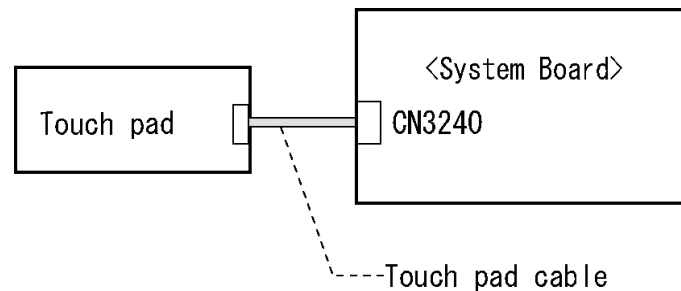
Check 1 Make sure the keyboard cable is securely connected to CN3230 on the system board.



If the connection is loose, reconnect firmly and go to Procedure 1. If there is still an error, go to Check 2.

Check 2 The keyboard or its cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 8.

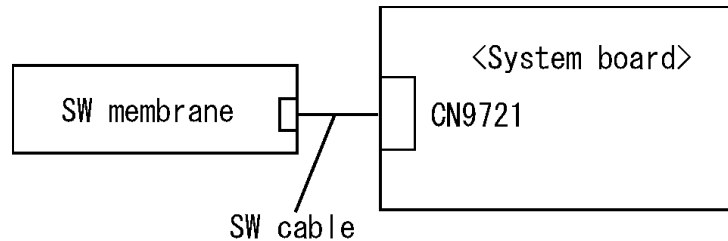
Check 3 Make sure the touch pad cable is firmly connected to CN3240 on the system board.



If the connection is loose, reconnect firmly and go to Procedure 1. If there is still an error, go to Check 4.

Check 4 The touch pad may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 5.

- Check 5 The touch pad cable may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 8.
- Check 6 Make sure the SW cable is firmly connected to CN9721 on the system board.



If the connection is loose, reconnect firmly go to procedure 1. If there is still an error, go to Check 7.

- Check 7 The SW membrane may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 8.
- Check 8 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.8 Display Troubleshooting

This section describes how to determine if the computer's display is functioning properly. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Cable Check

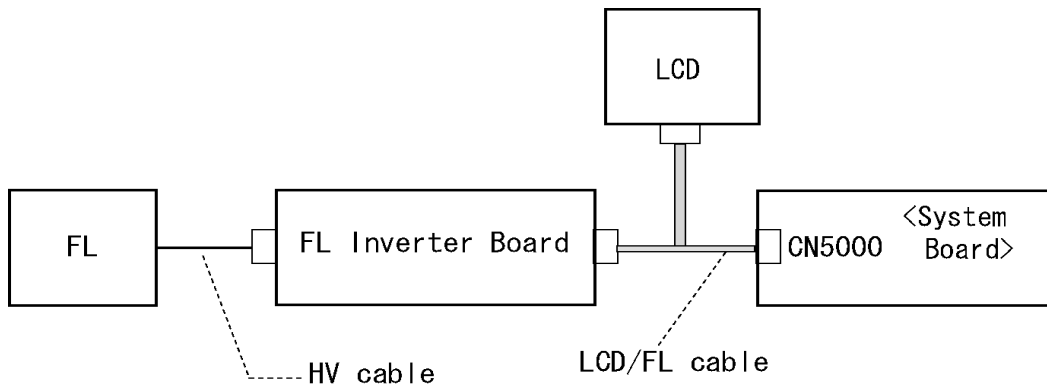
Procedure 3: Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details. If an error is detected, go to Procedure 2.

Procedure 2 Connector Check and Cable Check

Check 1 The LCD, FL, FL Inverter Board and System Board are connected by the HV cable and LCD/FL cable as shown bellow. Check the connections. The connectors may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*.



If the connection is loose, reconnect firmly and restart the computer. If there is still an error, go to Procedure 3.

Procedure 3 Replacement Check

The FL, FL inverter board, LCD module, and system board are connected to display circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*.

- Check 1 Replace the display cable (FL cable and LCD cable) with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 2.
- Check 2 Replace the FL with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check3.
- Check 3 Replace the LCD module with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again. If the problem still exists, perform Check 4
- Check 4 The display controller on the system board may be damaged. Replace the system board with a new one following the instructions in Chapter 4, *Replacement Procedures*.

2.9 Optical Drive Troubleshooting

This section describes how to determine if the optical drive (DVD-ROM&CD-R/RW or DVD Super Multi drive) is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

The CD-ROM/DVD-ROM test program is stored in the Diagnostics Disk.

For the test, prepare test Media.

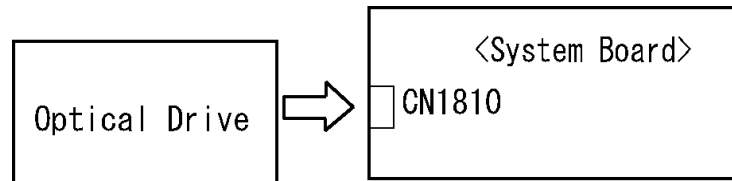
Then insert the Diagnostics Disk in the USB floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

If any errors occur while executing the CD-ROM/DVD-ROM test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

The optical drive (DVD-ROM&CD-R/RW or DVD Super Multi drive) is connected to the system board. The connectors may be disconnected from the system board or may be damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

Check 1 Make sure the drive to test is firmly connected to CN1810 on the system board.



If the connection is loose, reconnect firmly and repeat Procedure 1. If there is still an error, go to Check 2.

Check 2 The drive may be defective or damaged. Replace the drive with a new one. If there is still an error, go to Check 3.

Check 3 Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.10 Modem Troubleshooting

This section describes how to determine if the computer's modem is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

Insert the LAN/Modem/Bluetooth/IEEE1394 test program in the USB floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for more information about the diagnostics test procedures.

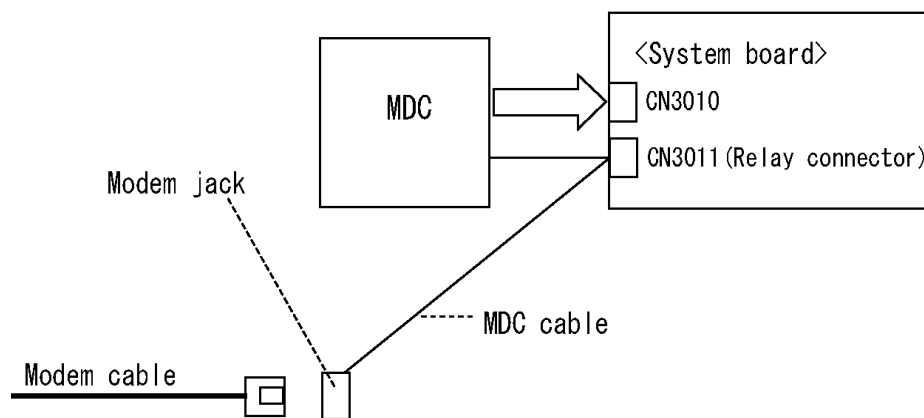
If any errors occur while executing the Sound/Modem/LAN test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

The Modem is installed as a MDC (Modem Daughter Card). If the modem malfunctions, there may be a bad connection between the MDC and the system board. Or the MDC, system board or their connectors might be damaged.

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

- Check 1 Make sure the MDC is firmly connected to CN3010 on the system board, MDC cable to Modem jack via the connector CN3011 on the system board from MDC and Modem cable to the Modem jack.



If connections are disconnected, connect them firmly and repeat Procedure 1. If the modem is still not functioning properly, perform Check 2.

- Check 2 The MDC may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 3.
- Check 3 The MDC cable may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the modem is still not functioning properly, perform Check 4.
- Check 4 The system board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.11 LAN Troubleshooting

This section describes how to determine if the computer's LAN is functioning properly. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check and Replacement Check

Procedure 1 Diagnostic Test Program Execution Check

Execute the LAN test program available as part of the LAN/Modem/Bluetooth/IEEE1394 test program. Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

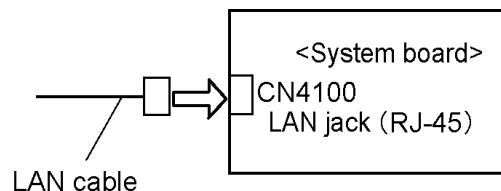
If any error is detected by the test, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

The RJ-45 jack with LAN cable is connected to the system board. If the LAN malfunctions, the system board might be damaged.

Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following check:

Check 1 Make sure the RJ-45 jack is firmly connected to CN4100 on the system board.



If the connectors are disconnected, connect it firmly and repeat Procedure 1. If the LAN function is still not functioning properly, perform Check 2.

Check 2 The system board may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.12 Bluetooth Troubleshooting

This section describes how to determine if the computer's Bluetooth is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Transmitting-Receiving Check

Procedure 2: Connection Check

Procedure 3: Replacement Check

Procedure 1 Transmitting-Receiving Check

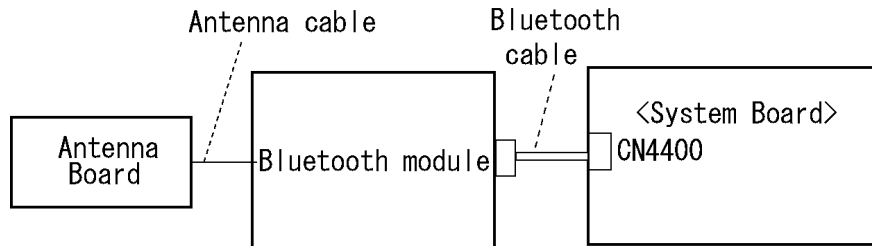
Make sure the wireless switch on the left side of the computer is turned "On". If it is not, slide the switch toward the back of the computer to turn it on.

Check 1 Execute Bluetooth test program. Perform the test following the instructions described in Chapter 3, Bluetooth Test Program. You will need a second computer that can communicate by the Bluetooth.

If the computer passes the test, the function is correctly working. If the computer does not pass the test, perform Procedure 2.

Procedure 2 Connection Check

The Bluetooth function wiring diagram is shown below:



Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

- Check 1 Make sure that the wireless communication switch is “On”.
If the switch is “Off”, turn it “On”. If the problem still occurs, perform Check 2.
- Check 2 Make sure the Bluetooth module is firmly connected to the connector CN4400 on the system board.
If the connector is disconnected, connect it firmly and go to Procedure 1. If the Bluetooth module is still not functioning properly, perform Check 3.
- Check 3 Make sure the Bluetooth antenna cable is firmly connected to the Bluetooth module.
If the Bluetooth antenna cable is disconnected, connect it firmly and go to Procedure 1. If the Bluetooth module is still not functioning properly, go to Procedure 3.

Procedure 3 Replacement Check

The Bluetooth antenna, Bluetooth module, sound board and system board are connected to the circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

- Check 1 The Bluetooth module may be defective or damaged. Replace the Bluetooth module with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 2.
- Check 2 The Bluetooth antenna may be defective or damaged. Replace the Bluetooth antenna with a new one following the steps in Chapter 4, *Replacement Procedures*. If the Bluetooth is still not functioning properly, perform Check 3.
- Check 3 The system board may be defective or damaged. Replace the system board with a new one following the steps in Chapter 4, *Replacement Procedures*.

2.13 Wireless LAN Troubleshooting

This section describes how to determine if the computer's Wireless LAN is functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Transmitting-Receiving Check

Procedure 2: Antenna Connection Check

Procedure 3: Replacement Check

Procedure 1 Transmitting-Receiving Check

Make sure the wireless switch on the left side of the computer is turned "On". If it is not, slide the switch toward the back of the computer to turn it on.

Refer to Chapter 3, *Tests and Diagnostics* for more information on how to perform the test program.

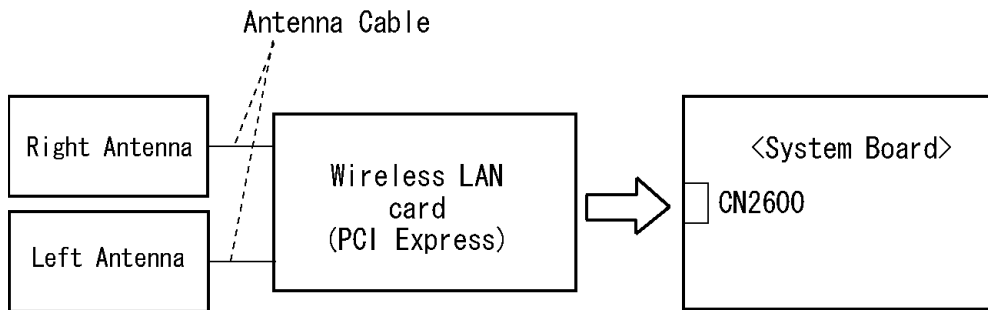
Check 1 Execute test program for the wireless LAN function to check the transmitting-receiving function of the wireless LAN. You will need a second computer that can communicate by the wireless LAN.

If the computer passes the test, the function is correctly working.

If the computer does not pass the test, perform Procedure 2.

Procedure 2 Antenna Connection Check

The wireless LAN wiring diagram is shown below:



Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks:

Check 1 Make sure the wireless LAN card is firmly connected to CN2600 on the system board.

If the connector is disconnected, connect it firmly and go to Procedure 1. If the wireless LAN card is still not functioning properly, perform Check 2.

Check 2 Make sure the wireless LAN antenna cables are firmly connected to the wireless LAN card.

If the wireless LAN antenna cables are disconnected, connect them firmly and go to Procedure 1. If the wireless LAN card is still not functioning properly, go to Procedure 3.

Procedure 3 Replacement Check

The wireless LAN antenna, wireless LAN card and the system board are connected to the circuits. Any of these components may be damaged. Refer to Chapter 4, *Replacement Procedures*, for instructions on how to disassemble the computer and then perform the following checks:

Check 1 The wireless LAN card may be defective or damaged. Replace it with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 2.

Check 2 The wireless LAN antenna may be defective or damaged. Replace the antenna with a new one following the steps in Chapter 4, *Replacement Procedures*. If the problem still exists, perform Check 3.

Check 3 The system board may be defective or damaged. Replace the board with a new one following the instructions in Chapter 4, *Replacement Procedures* and test the display again.

2.14 Sound Troubleshooting

NOTE: *On the Operation Systems other than Windows/Vivace, sounds come from the internal speaker, even if a headphone connected.*

This section describes how to determine if the computer's sound functions are functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Diagnostic Test Program Execution Check

Procedure 2: Connector Check

Procedure 3: Replacement Check

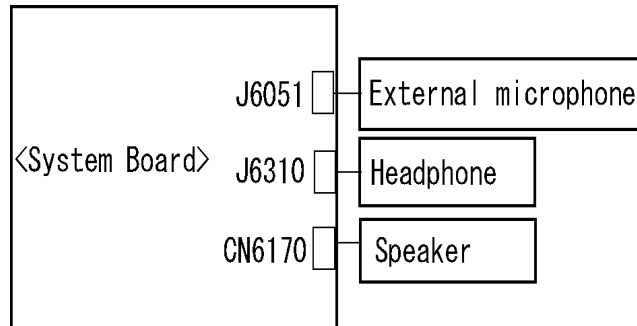
Procedure 1 Diagnostic Test Program Execution Check

Insert the Sound test program in the USB floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics*, for details.

If an error is detected, go to Procedure 2.

Procedure 2 Connector Check

The sound function-wiring diagram is shown below:



Any of the connections may be disconnected. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures* and perform the following checks:

1. If the stereo speakers do not work correctly, perform Check 1.
2. If the headphone does not work correctly, perform Check 2.
3. If the microphones do not work correctly, perform Check 3.

Check 1 If the stereo speakers do not work properly, the speaker cable may be disconnected. Make sure the speaker cable is firmly connected to CN6170 on the system board. If the stereo speakers are still not functioning properly, go to Procedure 3.

Check 2 If the headphone does not work properly, the headphone cable may be disconnected. Make sure the headphone cable is firmly connected to J6310 on the system board. If the sound function still does not work properly, Procedure 3.

Check 3 If the external microphones do not work properly, external microphone cable may be disconnected. Make sure the external microphone cable is firmly connected to J6051 on the system board.
If the external microphones are still not functioning properly, go to Procedure 3.

Procedure 3 Replacement Check

- Check 1 If the stereo speakers do not sound properly, the right or left speaker may be defective or damaged. Replace it with a new one. If the stereo speakers still do not work properly, go to Check 2.
- Check 2 If the headphone or external microphone does not sound properly, the system board may be defective or damaged. Replace the system board with a new one.

2.15 SD card Slot Troubleshooting

This section describes how to determine if the computer's SD card functions are functioning properly. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Check on Windows XP

Procedure 2: Connector Check and Replacement Check

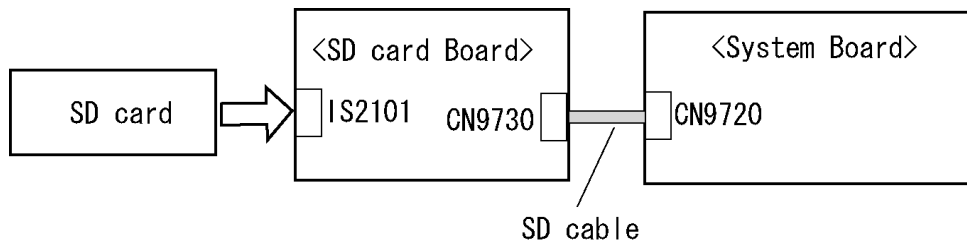
Procedure 1 Check on Windows XP

Insert a SD card into the slot. Check if the installed Windows recognizes automatically the SD card and the data in the SD card can be read.

If the card is not recognized or data are not read, go to Procedure 2.

Procedure 2 Connector Check and Replacement Check

The SD card is connected to IS2101 on the SD card board (FHBID*/FHBAD*).



- Check 1 The SD card, SD card board and system board may be disconnected. Make sure the SD card is firmly inserted to IS2101 on the SD card board and the SD cable is firmly connected to the connector CN9730 on the SD card board and the connector CN9720 on the system board. If not, insert them firmly. If the SD card is still not functioning properly, perform Check 2.
- Check 2 The SD card may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*. If the problem continues, perform Check 3.
- Check 3 The SD card board may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*. If the problem continues, perform Check 4.
- Check 3 The system board may be faulty. Replace it with a new one following the step in Chapter 4 *Replacement Procedures*.

2.16 Fingerprint sensor Troubleshooting

CAUTION: To delete the account for confirming the fingerprint operation, it is necessary to log on by the account with the management authority. If the password has been set to log on, ask the Log-ON password to the user.

To check if the Fingerprint sensor works correctly or not, follow the troubleshooting procedures below as instructed.

When failed in Procedure 1 to Procedure 3, execute Procedure 4.

Procedure 1: Setting Windows Log-ON password

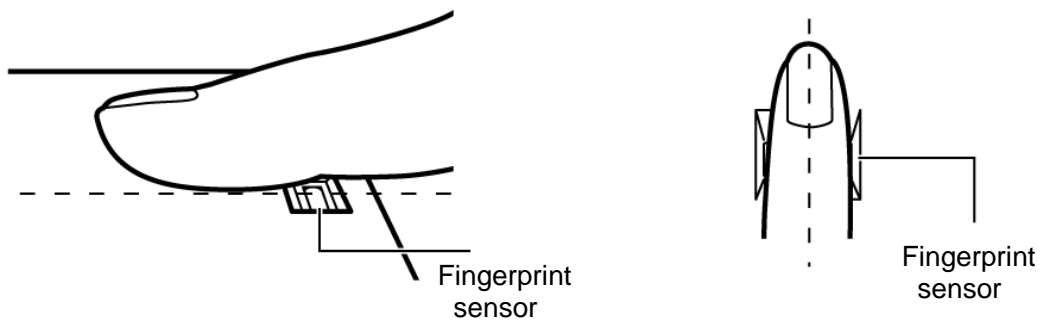
Procedure 2: Registration of fingerprint

Procedure 3: Authentication of fingerprint

Procedure 4: Connector Check and Replacement Check

CAUTION: Scan your finger shown below.

1. Lay your finger straight to the sensor and put lightly the first joint of your finger at the centerline of the fingerprint sensor.
2. Slide slowly your finger from the first joint to fingertip at constant speed. When not recognized, adjust the speed.

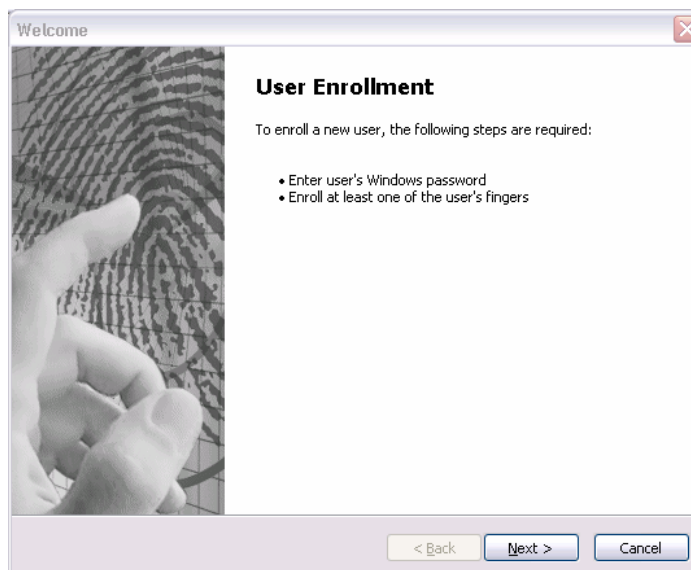


Procedure 1 Setting Windows Log-ON password

1. Open [User Account] from [Control Panel].
2. Click [User Account].
3. Click the icon of the account (user's name) that you want to set the password.
4. Click "Create Account".
5. Type a password in "Type a new password".
6. Press **Tab** key.
7. Type the password again.
8. Click "Create Password" button.
9. When "Do you want to make your files and folders private" appears in [Computer administrator], click [Yes, Make Private].

Procedure 2 Registration of fingerprint

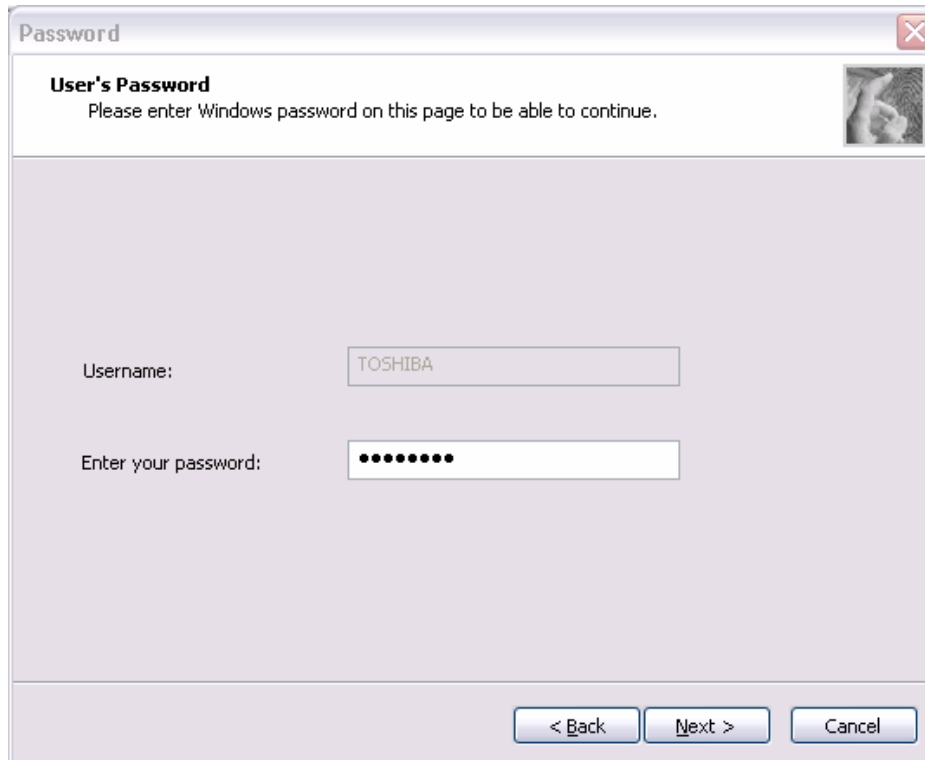
1. Logon by user's account to register the fingerprint.
2. Open [Start] → [All Programs] → [Protector Suite QL] → [User Enrollment].
3. After displaying [User Enrollment], click [Next].



[User's Passport] appears in “Enter your password”. Click [Next].

When the finger print has been enrolled, [User's Password] appears. Slide your finger enrolled or type the password. Click [Next].

4. Type the Windows login password in “Enter your password” and click [Next].
[User's Password] appears.



Password

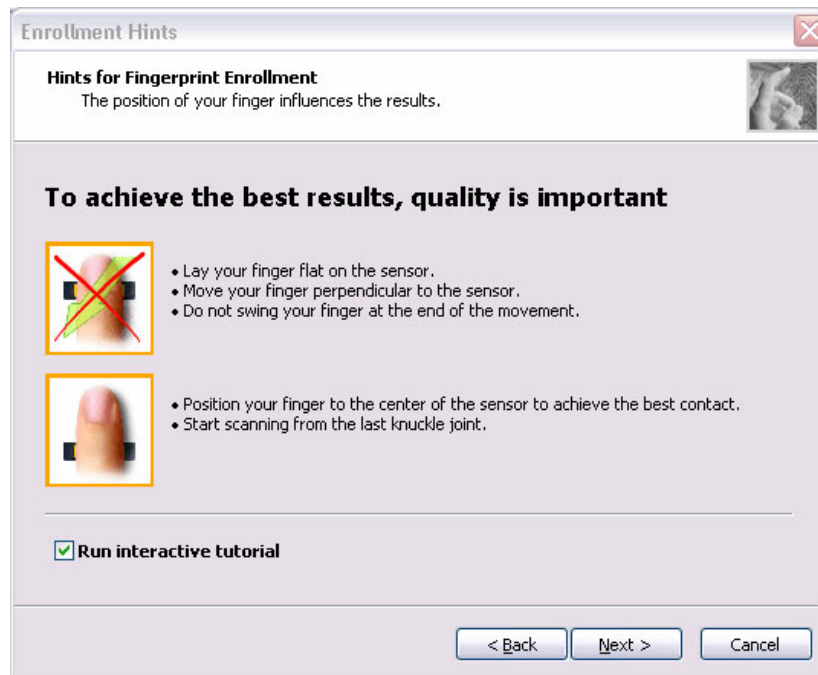
User's Password
Please enter Windows password on this page to be able to continue.

Username: TOSHIBA

Enter your password: ●●●●●●●●●●

< Back Next > Cancel

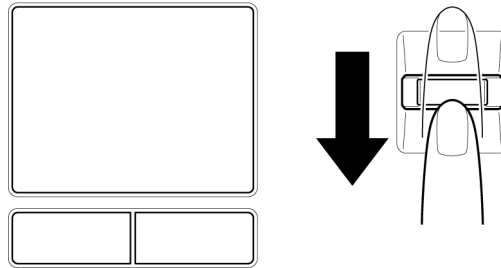
5. Confirm that the box of [Run interactive tutorial] is checked (when proceeding with seeing Tutorial) and click [Next].



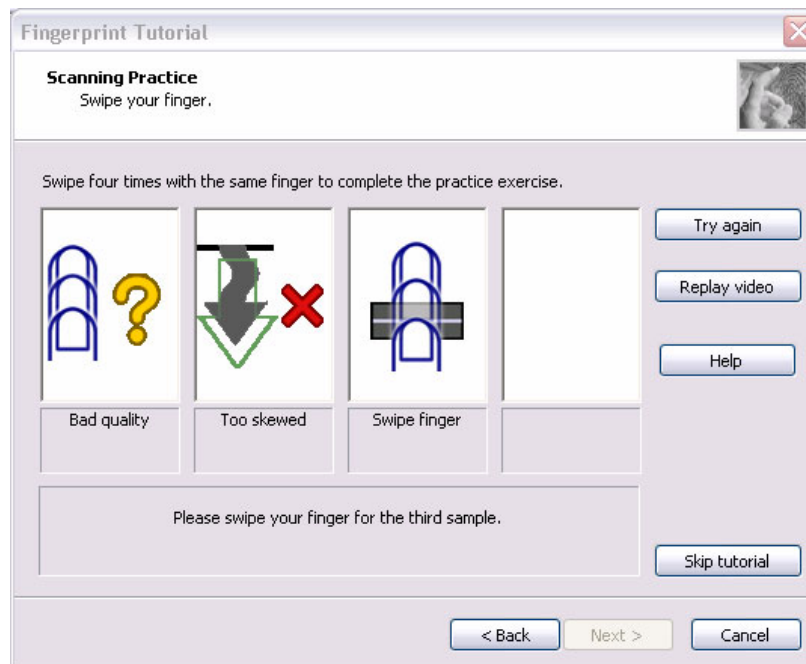
6. Watch the Video carefully, click [Next].



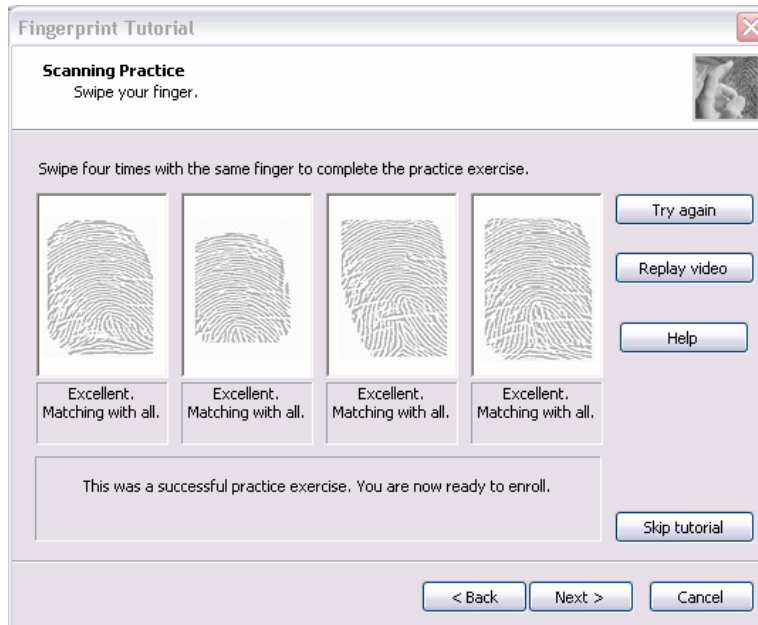
- Put lightly your finger on the fingerprint sensor at the right side of the touchpad and slide your finger toward you.



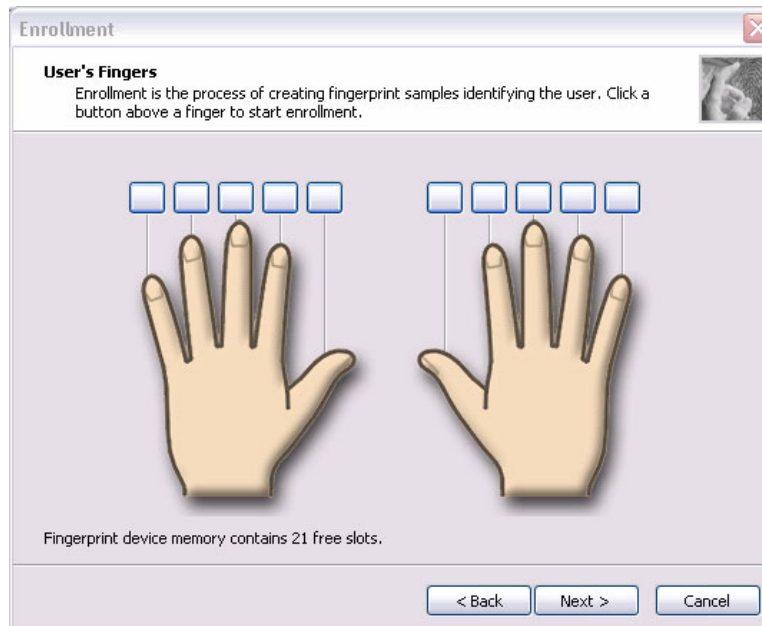
Slide your finger four times. Four boxes are filled with fingerprints. At this time, when you click the [Replay video], you can watch the video that you have watched in Procedure 6.



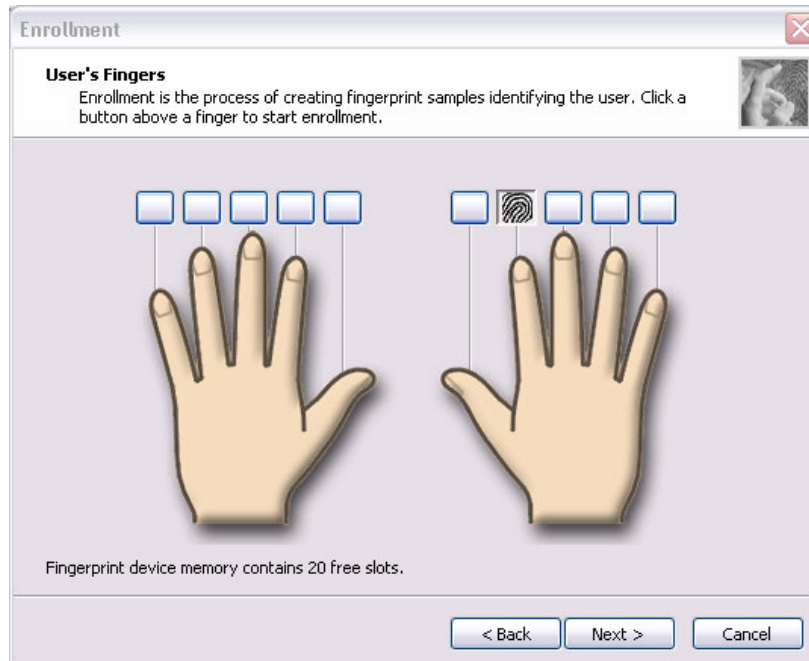
When you have failed in any time of four times reading and want to practice again, click [Try again]. When you have fully succeeded in four times of reading, the message of “Fully succeeded” appears.



8. Click [Next]. The display of [User's Fingers]
9. Click the box you want to enroll.



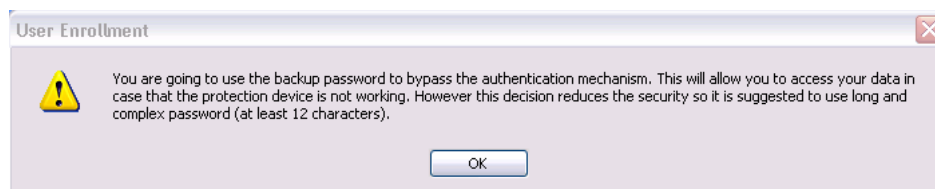
Put lightly the first joint of your finger you want to enroll on the fingerprint sensor and slide your finger toward you. Enroll your finger three times. Every time your finger has been successfully enrolled, one box is checked. When your finger has been successfully enrolled three times, the message of “Succeeded” appears.



When you do not enroll your finger within two minutes after [User's Fingerprint] has been displayed, an error message appears. At the time, click [OK] and enroll your fingerprint.

When you attempt to enroll your finger that has been enrolled, you can not enroll. Enroll your other finger again.

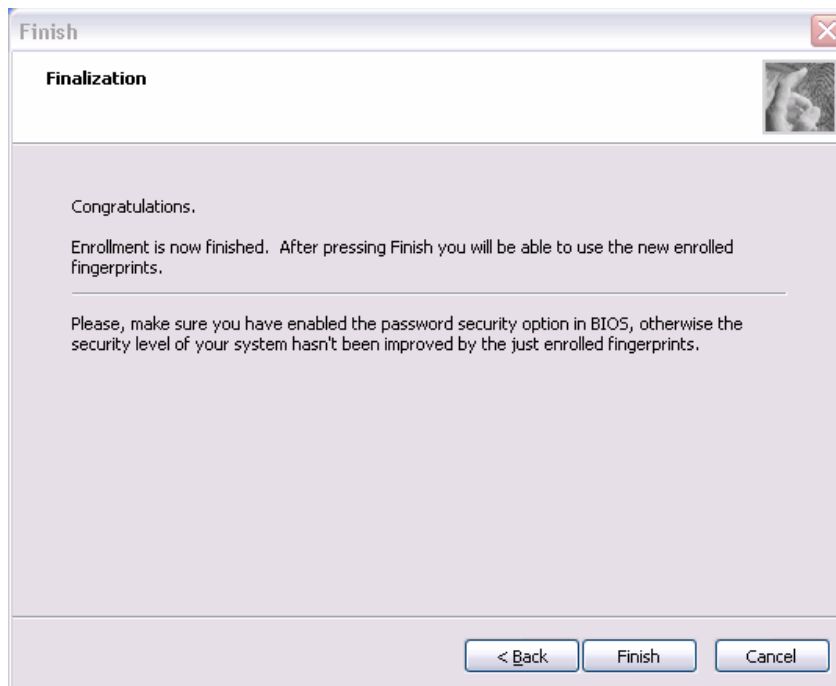
10. Enroll another finger in Procedure 9. Enroll two fingers at least.
11. The display that recommend you to register a password.
12. Click [OK] in the following display.



13. Type a backup password two times in the following display. (This password is different from the password of Windows logon.)

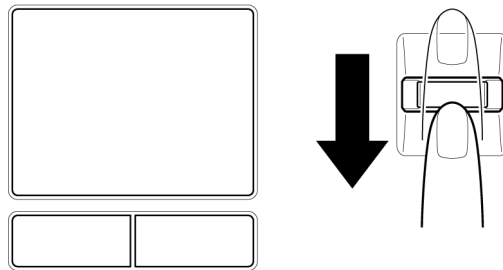


14. Click [Next]. The [Finish] display appears.
15. Click [Finish], “Welcome” display appears.



Procedure 3 Authentication of fingerprint

1. Turn on the computer to start up Windows.
2. In the Windows logon window, put lightly the first joint of your finger registered and slide your finger toward you.



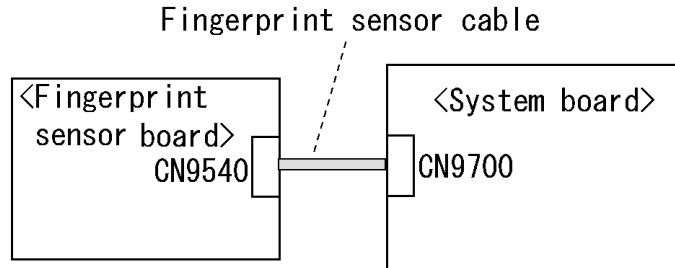
When authenticated, [Success] is displayed in the fingerprint authentication display.

When not authenticated well, warning message appears. If you fail continually ten times or more, you can not use the fingerprint authentication about one minute.

When not authenticated, type the password to logon to Windows.

Procedure 4 Connector Check and Replacement Check

The Fingerprint sensor cable is connected to the connector CN9540 on the Fingerprint sensor board and connector CN9700 on the system board.



- Check 1 Check the Fingerprint sensor cable is firmly connected to the connector CN9540 on the Fingerprint sensor board and connector CN9700 on the system board. If not, connect it firmly. If the Fingerprint sensor is still not functioning properly, perform Check 2.
- Check 2 The Fingerprint sensor cable may be faulty. Replace it with a new one. If the problem persists, perform Check 3.
- Check 3 The Fingerprint sensor board may be faulty. Replace it with a new one. If the problem persists, perform Check 4.
- Check 4 The system board may be faulty. Replace it with a new one.

Chapter 3

Tests and Diagnostics

Chapter 3 Contents

3.1	The Diagnostic Test	3-1
3.1.1	Diagnostics menu	3-1
3.1.2	H/W (Hardware) initial information setting tool.....	3-3
3.1.3	Heatrun test program.....	3-3
3.2	Executing the Diagnostic Test	3-4
3.2.1	Diagnostics menu (T&D).....	3-5
3.2.2	H/W initial information setting tool	3-8
3.2.3	Heatrun test program.....	3-8
3.3	Setting of the hardware configuration.....	3-9
3.4	Heatrun Test.....	3-11
3.5	Subtest Names.....	3-12
3.6	System Test.....	3-14
3.7	Memory Test.....	3-16
3.8	Keyboard Test.....	3-17
3.9	Display Test	3-18
3.10	Floppy Disk Test.....	3-21
3.11	Printer Test.....	3-23
3.12	Async Test	3-25
3.13	Hard Disk Test	3-26
3.14	Real Timer Test.....	3-29
3.15	NDP Test.....	3-31
3.16	Expansion Test.....	3-32
3.17	CD-ROM/DVD-ROM Test	3-34
3.18	Error Code and Error Status Names.....	3-35
3.19	Hard Disk Test Detail Status.....	3-38
3.20	ONLY ONE TEST.....	3-40
3.20.1	Program Description	3-40
3.20.2	Operations	3-40

3.21	Head Cleaning.....	3-47
	3.21.1 Function Description.....	3-47
	3.21.2 Operations.....	3-47
3.22	Log Utilities.....	3-48
	3.22.1 Function Description.....	3-48
	3.22.2 Operations.....	3-49
3.23	Running Test.....	3-50
	3.23.1 Function Description.....	3-50
	3.23.2 Operations.....	3-50
3.24	Floppy Disk Drive Utilities.....	3-51
	3.24.1 Function Description.....	3-51
	3.24.2 Operations.....	3-52
3.25	System Configuration.....	3-56
	3.25.1 Function Description.....	3-56
	3.25.2 Operations.....	3-57
3.26	Wireless LAN Test Program (Atheros).....	3-58
	3.26.1 Setting the responder machine.....	3-59
	3.26.2 Test procedure.....	3-60
	3.26.3 Contents of the test and errors.....	3-61
3.27	Wireless LAN Test Program (Intel-made b/g, a/b/g).....	3-65
3.28	LAN/Modem/Bluetooth/IEEE1394 Test Program.....	3-69
	3.28.1 LAN test.....	3-69
	3.28.2 Modem test.....	3-72
	3.28.3 Bluetooth test.....	3-73
	3.28.4 IEEE1394 test.....	3-83
3.29	Sound Test program.....	3-84
	3.29.1 Sound (Standard) test.....	3-84
	3.29.2 Sound (Legacy) test.....	3-86
	3.29.3 CD Sound (Standard) test.....	3-87
	3.29.4 CD Sound (Legacy) test.....	3-89

3.30	SETUP	3-90
3.30.1	Function Description	3-90
3.30.2	Accessing the SETUP Program.....	3-92

Tables

Table 3-1	Subtest names	3-12
Table 3-2	Error codes and error status names	3-35
Table 3-3	Hard disk controller status register contents.....	3-38
Table 3-4	Error register contents.....	3-39
Table 3-5	Error message.....	3-75
Table 3-6	Error code for Bluetooth test (BD_ADDR)	3-76
Table 3-7	Error code for Bluetooth test (BD_ADDR of the DUT).....	3-80
Table 3-8	Common error code	3-82

3.1 The Diagnostic Test

This chapter explains how to use the Diagnostic Test programs to test the functions of the computer's hardware modules. The Diagnostics Programs are stored on some Diagnostic Disks. There are Service Program Modules (DIAGNOSTIC MENU) and the Test Program Modules (DIAGNOSTIC TEST MENU) on the Diagnostic Disk.

The Hardware Initial information Setting Tool consists of some programs which write the hardware information or displays the current information of the computer. It is also included in one of Diagnostic Disks.

The heatrun test is automatic test program which executes the some tests successively.

NOTE: Before starting the diagnostics, be sure to follow these steps:

1. Check all cables are connected firmly.
2. Exit any application and close Windows.
3. Check if [All Devices] is selected in the "Device Config." in SETUP menu.

3.1.1 Diagnostics menu

The DIAGNOSTIC MENU consists of the following functions.

- DIAGNOSTIC TEST
- ONLY ONE TEST
- HEAD CLEANING
- LOG UTILITIES
- RUNNING TEST
- FDD UTILITIES
- SYSTEM CONFIGURATION
- POWER OFF

The DIAGNOSTIC TEST MENU contains the following functional tests:

- SYSTEM TEST
- MEMORY TEST
- KEYBOARD TEST
- DISPLAY TEST
- FLOPPY DISK TEST
- PRINTER TEST
- ASYNC TEST
- HARD DISK TEST
- REAL TIMER TEST

- NDP TEST
- EXPANSION TEST
- CD-ROM/DVD-ROM TEST

Other tests are:

- Wireless LAN TEST (Wireless LAN TEST disk)
- LAN/Modem/Bluetooth/IEEE1394 TEST (LAN/Modem/Bluetooth/IEEE1394 TEST disk)
- Sound TEST (Sound TEST disk)

You will need the following equipment to perform some of the Diagnostic test programs.

- The Diagnostic Disks (T&D for maintenance for Main, LAN/Modem/Bluetooth/IEEE1394, wireless LAN and Sound)
- A formatted working disk (Floppy disk test)
- USB FDD (for all tests)
- A USB test module (USB test)
- A USB cable (USB test)
- An external CRT monitor (Expansion test)
- A CD test media TOSHIBA CD-ROM TEST DISK or ABEX TEST CD-ROM (Sound test)
- A DVD test media (DVD-ROM TEST DISK TSD-1) (Sound test)
- A music CD (Sound test)
- A store-bought CD-RW media (CD-ROM/DVD-ROM test)
- A microphone (Sound test)
- Headphones (Sound test)
- A cleaning kit to clean the floppy disk drive heads (Head Cleaning)
- An exclusive modem test jig (Nitto Electric Manufacture Co.,Ltd-made QE2000P01) (Modem test)
- A module cable and RJ11 connector checker (Modem test)
- A LAN wraparound connector (LAN test)
- PC card wraparound connector (Expansion test)
- A display with monitor ID function (Expansion test)
- RS232C wraparound connector (Async test)
- A PC for wraparound test (Wireless LAN test/Bluetooth test/IEEE1394 test)

3.1.2 H/W (Hardware) initial information setting tool

The H/W initial information setting tool consists of the following programs.

- Initial configuration
- DMI information save
- DMI information recovery
- System configuration display
- E2PROM test (MAC/GUID/DMI)

You will need the following equipment to perform some of the programs.

- The Diagnostics Disk (Main T&D)

3.1.3 Heatrun test program

The heatrun test starts automatically after the selection.

You will need the following equipment to perform this program.

- The Diagnostics Disk (Main T&D)

3.2 Executing the Diagnostic Test

To start the DIAGNOSTIC PROGRAM, follow these steps:

1. Insert the Diagnostics disk in the USB floppy disk drive.
2. Turn on the computer while pressing **U** key. The following menu appears.

```
Repair test program   (Hiderbelg10)
-----
(1) Repair Main
(2) Repair Initial config set
(3) Repair Heatrun

Select From Menue (123) or press [Enter] (Selection=1)
Singlestepping (F8) is :OFF
```

To start the Diagnostics menu (T&D), press **1**, or select (1) Repair Main and press **Enter**.

To start the H/W initial information setting tool, press **2**, or select (2) Repair Initial config set and press **Enter**.

To start the Heatrun test, press **3**, or select (3) Repair Heatrun and press **Enter**.

NOTE: When replacing the system board, it is necessary to execute the followings:

1. Before replacing, save the DMI information by executing subtest 03 DMI information save in 3.3 Setting of the hardware configuration.
2. Before replacing, apply the DMI information by executing subtest 04 DMI information recovery and subtest 08 System configuration in 3.3 Setting of the hardware configuration.

3.2.1 Diagnostics menu (T&D)

To execute this program, press **1**, or select (1) Repair Main and press **Enter** in the startup menu, press **Enter**. The following menu appears.

```
TOSHIBA personal computer XXXXXX DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 20XX
```

```
DIAGNOSTICS MENU :

1 - DIAGNOSTIC TEST
2 - ONLY ONE TEST
3 -
4 - HEAD CLEANING
5 - LOG UTILITIES
6 - RUNNING TEST
7 - FDD UTILITIES
8 - SYSTEM CONFIGURATION
9 - POWER OFF
```

```
↑↓→← : Select items
Enter  : Specify
Esc    : Exit
```

NOTE: To exit the **DIAGNOSTIC TEST MENU**, press the **Esc** key. If a test program is in progress, press **Ctrl + Break** to exit the test program. If a test program is in progress, press **Ctrl + C** to stop the test program.

Set the highlight bar to **1**, and press **Enter**. The following DIAGNOSTIC TEST MENU will appear:

```
TOSHIBA personal computer XXXXXX DIAGNOSTICS
version X.XX (c) copyright TOSHIBA Corp. 20XX
```

```
DIAGNOSTIC TEST MENU :
```

```
1 - SYSTEM TEST
2 - MEMORY TEST
3 - KEYBOARD TEST
4 - DISPLAY TEST
5 - FLOPPY DISK TEST
6 - PRINTER TEST
7 - ASYNC TEST
8 - HARD DISK TEST
9 - REAL TIMER TEST
10 - NDP TEST
11 - EXPANSION TEST
12 - CD-ROM/DVD-ROM TEST
88 - ERROR RETRY COUNT SET [FDD & HDD]
99 - EXIT TO DIAGNOSTICS MENU
```

```
↑↓→← : Select items
Enter  : Specify
Esc    : Exit
```

Functions 1 through 12 are the Diagnostic Tests. Function 88 sets the floppy disk drive and hard disk drive error retry count (0-255).

To exit the submenu of the Diagnostic Test and returns to the Diagnostics Menu, set the highlight bar to function 99 and press **Enter**.

Select the option you want to execute and press **Enter**. When you select 1- SYSTEM TEST, the following message will appear:

```

SYSTEM TEST NAME      XXXXXX
XXXXXXXXX DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break]       : test end
[Ctrl]+[C]           : key stop

```

```

SUB-TEST      : XX
PASS COUNT   : XXXXX      ERROR COUNT   : XXXXX
WRITE DATA  : XX         READ DATA   : XX
ADDRESS      : XXXXXX STATUS           : XXX

```

SUB-TEST MENU :

```

01 - ROM checksum
04 - Fan ON/OFF
05 - Geyserville
06 - Quick charge
07 - DMI read
99 - Exit to DIAGNOSTIC TEST MENU

```

```

↑↓→← : Select items
Enter : Specify
Esc   : Exit

```

NOTE: The menu displayed by your computer may be slightly different from the one shown above.

Select the desired subtest number from the subtest menu and press **Enter**. The following message will appear:

```

TEST LOOP   : YES (or NO)
ERROR STOP  : YES (or NO)

```

Use the right and left arrow keys to move the cursor to the desired option.

Selecting **YES** of TEST LOOP increases the pass counter by one, each time the test cycle ends and restarts the test cycle.

Selecting **NO** returns the process to the subtest menu after the test is complete.

Use the up and down arrow keys to move the cursor to "ERROR STOP".

Use the right and left arrow keys to move the cursor to the desired option and press **Enter**.

Selecting **YES** of ERROR STOP stops the test program when an error is found and displays the operation guide on the right side of the display screen as shown below:

```

ERROR STATUS NAME    [[ HALT OPERATION ]]

                        1: Test end
                        2: Continue
                        3: Retry

```

These three selections have the following functions respectively:

1. Terminates the test program and exits to the subtest menu.
2. Continues the test.
3. Restarts the test from the error.

Selecting **NO** keeps the test running even if an error is found. When an error occurred, the error status is displayed and one error is added to the error counter.

Table 3-1 in section 3.5 describes the function of each test on the subtest. Table 3-2 in section 3.18 describes the error codes and error status names for each error.

Details of tests in DIAGNOSTIC TEST MENU are described on and after section 3.6. As for other service programs, refer to section 3.20 to 3.25

3.2.2 H/W initial information setting tool

After selecting this test, the following menu appears in the display.

```

#####
#####      H/W initial information setting tool      VX.XX      #####
#####
*          1 ..... Initial configuration                *
*          3 ..... DMI information save                 *
*          4 ..... DMI information recovery             *
*          8 ..... System configuration display         *
*          9 ..... E2PROM test (MAC/GUID/DMI)          *
*****
... Press test number [1,3,4,8,9] ?

```

For more details on this test, refer to the section 3.3.

3.2.3 Heatrun test program

After selecting this test, the heatrun test starts executing the same subtest as 3.23 RUNNING TEST.

For more details on this test, refer to the section 3.4.

3.3 Setting of the hardware configuration

To execute this program, press **2**, or select (2) Repair Initial config set and press **Enter** in the startup menu, press **Enter** and follow the directions on the screen. The H/W initial information setting tool consists of four subtests. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Initial configuration

This subtest executes the following items and shows their contents in the display. When an item ends normally, the program proceeds automatically to the next one. When an error is found, the program stops and waits for key input. (After solving the problem, the program executes the item again.)

- Setting of the CPU set table
- Setting of the micro code
- Setting of the EHSS
- Inputting and writing of DMI information

When the DMI information is displayed, the following messages appear in order. Input each information. (If you do not replace the PCB, the DMI information should not be changed.)

1. “Enter Model Name ?” is displayed. Input the computer’s model name and press **Enter**. (e.g. DynaBook)
2. “Enter Version Number ?” is displayed. Input the computer’s version number and press **Enter**.
(e.g. PC18070C313S)
3. “Enter Serial Number ?” is displayed. Input the computer’s serial number and press **Enter**. (e.g. 12345678)
4. “Enter Model Number ?” is displayed. Input the computer’s sales model number and press **Enter**. (e.g. PP200-AAAAA)
5. “Enter Bundle Number ?” is displayed. Input the computer’s PCN/Bundle number and press **Enter**.
(e.g. PMSREQ3Q34H/S0123456789)
6. “Write data OK (Y/N) ?” is displayed. To write the DMI information to the Flash ROM, press **Y**, and then **Enter**.

7. “Create DMIINFO TXT (Y/N) ?” is displayed. Press **Y**, then the DMI information (text data) is written to the Floppy disk, etc.

- Setting of the HWSC
- Setting of the UUID
- Display of the DMI information (including UUID)

After completion of the above settings, H/W configuration & DMI information are appeared in order. Check the contents and press **Enter**.

Subtest 03 DMI information save

This is one of tools to copy the DMI information to a new PCB after replacing.

This subtest saves all the DMI data in a floppy disk.

Subtest 04 DMI information recovery

This is one of tools to copy the DMI information to a new PCB after replacing.

This subtest writes all the DMI data in the floppy disk into the new PCB.

NOTE: Since the data of UUID is updated every time when this subtest, DMI information recovery, is done, the saved UUID data is not written.

Subtest 08 System configuration display

This subtest displays the information of the system configuration.

When the following message appears, confirm the contents and press **Enter**.

Press [Enter] key

For more details on the system configuration information, refer to “3.25 System configuration”.

Subtest 09 E2PROM test (MAC/GUID/DMI)

It checks whether the MAC address, GUID of IEEE1394 and DMI information are written.

3.4 Heatrun Test

To execute this program, press **3**, or select (3) Repair Heatrun and press **Enter** in the startup menu, press **Enter**.

After selecting this test, the same subtests as 3.23 Running Test are executed successively.

For more details on the procedure and test content, refer to Running Test.

When the heatrun test ends normally, following message appears in the display.

```
*****  
HEATRAN NORMAL END  
*****  
Press any key to continue...
```

Press any key and return to the startup menu.

NOTE: *The test result (Errorlog.txt) is stored in the floppy disk. The result is displayed in the same format as Log Utilities. For more details of the format, refer to 3.22 Log Utilities.*

3.5 Subtest Names

Table 3-1 lists the subtest names for each test program in the DIAGNOSTIC TEST MENU.

Table 3-1 Subtest names (1/2)

No.	Test Name	Subtest No.	Subtest Name
1	SYSTEM	01	ROM checksum
		02	Fan ON/OFF
		03	Geyserville
		04	Quick charge
		05	DMI read
2	MEMORY	01	Conventional memory
		02	Protected Mode
		03	Protected Mode (cache off)
		04	Cache memory (on/off)
		05	Stress
3	KEYBOARD	01	Pressed key code display
4	DISPLAY	01	VRAM read/write for VGA
		02	Gradation for VGA
		03	Gradation for LCD
		04	Gradation & Mode test for VGA
		05	All dot on/off for LCD
		06	"H" pattern display
		07	LCD Brightness
5	FLOPPY DISK	01	Sequential read
		02	Sequential read/write
		03	Random address/data
		04	Write specified address
		05	Read specified address

Table 3-1 Subtest names (2/2)

No.	Test Name	Subtest No.	Subtest Name
6	PRINTER [Not supported]	01	Ripple pattern
		02	Function
		03	Wraparound
7	ASYNC [Not supported]	01	FIR/SIR Point to point (send)
		02	FIR/SIR Point to point (receive)
		03	Wraparound (board)
8	HARD DISK	01	Sequential read
		02	Address uniqueness
		03	Random address/data
		04	Cross talk & peak shift
		05	Partial Read
		06	Write specified address
		07	Read specified address
		08	Sequential write
		09	W-R-C specified address
9	REAL TIMER	01	Real time
		02	Backup memory
		03	Real time carry
10	NDP	01	NDP
11	EXPANSION	01	PCMCIA wraparound [Not supported]
		02	RGB monitor ID
12	CD-ROM /DVD-ROM	01	Sequential read
		02	Read specified address
		03	Random address/data
		04	RW 1point W/R/C

3.6 System Test

To execute the System Test, select **1** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 ROM checksum

This subtest executes a checksum test of the BIOS ROM (range: F0000h to FFFFFh, 64KB) on the System Board.

Subtest 02 Fan ON/OFF

The following message will appear.

```
Fan number select (1;FAN#1(CPU), 2;FAN#2(GPU)*1, 0; FAN#1&#2)?
```

To check the CPU fan, press **1** and **Enter**.

To check the GPU fan, press **2** and **Enter**.

To check both CPU fan and GPU fan, press **0** and **Enter**.

The following message will appear.

```
*** Test Fan Revolution 0000RPM start
```

Make sure the fan does not rotate, then press **Enter**.

The following message will appear.

```
*** Test Fan Revolution Low speed Start
```

Make sure the fan rotates at low speed, then press **Enter**.

The following message will appear.

```
*** Test Fan Revolution High speed Start
```

Make sure the fan rotates at high speed, then press **Enter**.

After a while, the fan rotating will stop.

*1 2;FAN#2(GPU) is not supported in this model.

Subtest 03 Geyserville

If the CPU supports Geyserville (SpeedStep), this subtest checks that the CPU operating clock speed can be changed.

Subtest 04 Quick charge

This subtest checks the status for the quick charge.

Subtest 05 DMI read

This subtest displays the information in the Flash-ROM in the following format.

```
*** DMI Data Display Ver X.XX ***  
Model Name       : XXXXXXXXXXXXX  
Version Number  : XXXXXXXXXXXXX  
Serial Number   : XXXXXXXXX  
Model Number    : XXXXXX-XXXXX  
UUID Number     : XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  
Press [Enter] to EXIT
```

To exit this subtest and return to the SYSTEM test menu, press **Enter**.

3.7 Memory Test

To execute the Memory Test, select **2** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Conventional memory

This subtest writes a constant data to conventional memory (0 to 640 KB), then reads the new data and compares the result with the original data.

Subtest 02 Protected Mode

NOTE: The *CONFIG.SYS* file must be configured without expanded memory manager programs such as *EMM386.EXE*, *EMM386.SYS* or *QEMM386.SYS*. Also, the *HIMEM.SYS* must be deleted from the *CONFIG.SYS* file.

This subtest writes constant data and address data (from 1MB to maximum MB), and reads the new data and compares the result with the original data.

Subtest 03 Protected Mode (cache off)

This subtest executes the same way as the subtest 02 with the cache off.

Subtest 04 Cache memory (on/off)

To test the cache memory, a pass-through write-read comparison of '5Ah' data is run repeatedly to the test area ('7000': 'Program' size to '7000': '7FFF' (32 KB)) to check the hit-miss ratio (on/off status) for CPU cache memory. One test takes 3 seconds.

Number of misses < Number of hits → OK

Number of misses ≥ Number of hits → Fail

Subtest 05 Stress

Write/Read buffer (1 size = 1B30h) is prepared in the conventional memory. The data is made in the Write Buffer, the data in Write Buffer is written in the area of address of 1MB or after. The data is red in the Read Buffer and data is compared in area up to the maximum size.

Data: FFh, FFh, FFh, FFh, FFh, 00h, 00h, 00h, 00h,
FFh, FFh, FFh, 00h, FFh, 00h, 00h, FFh, 00h,
00h, FFh, FFh, FFh, FFh, 00h, 00h, 00h, AAh

3.8 Keyboard Test

To execute the Keyboard Test, select **3** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Pressed key code display

When a key is pressed, the scan code, character code, and key top name are displayed on the screen in the format shown below. The **Ins Lock**, **Caps Lock**, **Num Lock**, **Scroll Lock**, **Alt**, **Ctrl**, **Left Shift** and **Right Shift** keys are displayed in reverse screen mode when pressed. The scan codes, character codes, and key top names are shown in Appendix E.

```
KEYBOARD TEST  IN PROGRESS  302000
      Scan code      =
      Character code  =
      Keytop         =
Ins Lock  Caps Lock  Num Lock   Scroll Lock
Alt       Ctrl       Left Shift  Right Shift
PRESS [Enter] KEY
```

3.9 Display Test

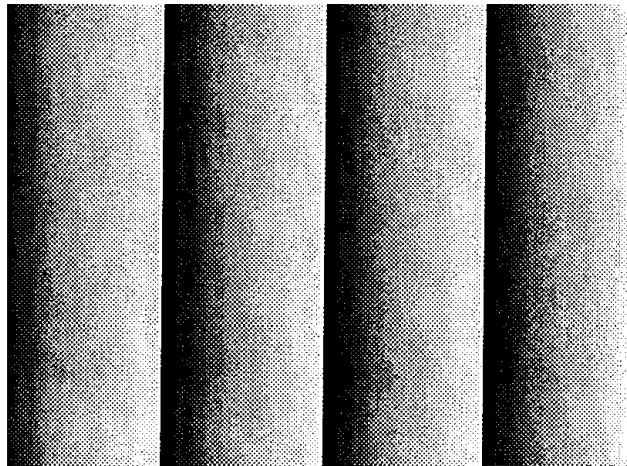
To execute the Display Test, select **4** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 VRAM read/write for VGA

This subtest writes the constant data (AAh and 55h) to the video RAM. The data is read and compared to the original data.

Subtest 02 Gradation for VGA

This subtest displays four colors: red, green, blue and white from left to right across the screen from black to maximum brightness. The display below appears on the screen, when this subtest is executed.



To exit this subtest and return to the DISPLAY TEST menu, press **Enter**.

Subtest 03 Gradation for LCD

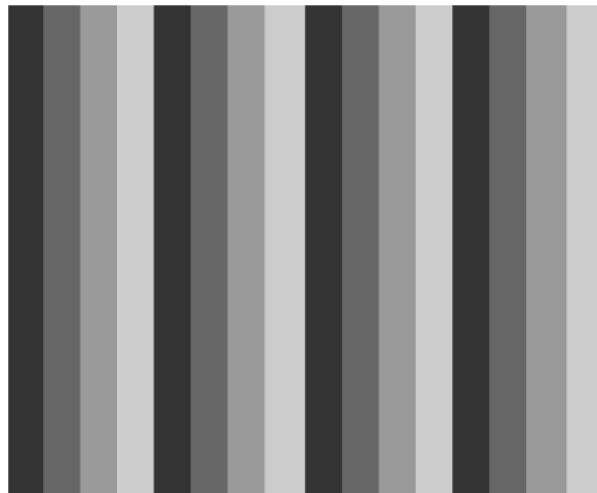
This subtest displays bands of gradations for mixed colors, then for red, green, and blue. Next, it displays eight solid colors full screen: red, semi-red, green, semi-green, blue, semi-blue, white and semi-white. Each color displays for three seconds.

Subtest 04 Gradation & Mode test for VGA

This subtest displays gradations for following modes. To change the mode, press **Enter**.

```
[Mode 12]
[Mode 13]
[Mode 3]
[Mode 111  640*480  64K]
[Mode 112  640*480  16M]
[Mode 114  800*600  64K]
[Mode 115  800*600  16M]
[Mode 117 1024*768  64K]
[Mode 118 1024*768  16M]
```

The display below appears on the screen when this subtest is executed.



(Display example: Mode 12)

To exit this subtest and return to the DISPLAY TEST menu, press **Enter** after displaying the Mode 118.

Subtest 05 All dot on/off for LCD

This subtest displays an all-white screen then an all-black screen. The display changes automatically every three seconds and the screen returns to the DISPLAY TEST menu.

3.10 Floppy Disk Test

CAUTION: Before running the floppy disk test, prepare a formatted work disk. Remove the Diagnostics Disk and insert the work disk into the FDD because the contents of the floppy disk will be erased.

To execute the Floppy Disk Test, select **5** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen.

1. The following message will appear. Select the media mode and start track to be tested and press **Enter**.

```
Test start track      (Enter:0/dd:00-79) ?
```

2. The Floppy Disk test contains five subtests that test the FDD. The floppy disk test menu will appear after you select FDD test parameters.

```
FLOPPY DISK          XXXXXXXX
```

```
XXX DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break] : test end
[Ctrl]+[C]     : key stop
```

```
SUB-TEST           : XX
PASS COUNT         : XXXXX   ERROR COUNT   : XXXXX
WRITE DATA        : XX      READ DATA   : XX
ADDRESS           : XXXXXX STATUS          : XXX
```

```
SUB-TEST MENU :
```

```
01 - Sequential read
02 - Sequential read/write
03 - Random address/data
04 - Write specified address
05 - Read specified address
99 - Exit to DIAGNOSTIC TEST MENU
```

```
↑↓→← : Select items
Enter : Specify
Esc   : Exit
```

Select the number of the subtest you want to execute and press **Enter**. The following message will appear during the floppy disk test.

```

FLOPPY DISK  IN PROGRESS  XXXXXXXX  xxx DIAGNOSTIC TEST VX.XX
                                         [Ctrl]+[Break] : test end
                                         [Ctrl]+[C]   : key stop

SUB-TEST      : XX
PASS COUNT    : XXXXX      ERROR COUNT   : XXXXX
WRITE DATA   : XX         READ DATA    : XX
ADDRESS       : XXXXXXXX STATUS           : XXX
  
```

When the subtest 04 or 05 is selected, the following messages will appear on the screen. Select the test data (subtest 04 only), track number and head number you want to test.

```

Test data ?? (subtest 04 only)
Track No. ??
Head No.  ?
  
```

Subtest 01 Sequential read

This subtest performs a Cyclic Redundancy Check (CRC) that continuously reads all the tracks (track: 0 to 39/0 to 79) on a floppy disk.

Subtest 02 Sequential read/write

This subtest continuously writes data pattern B5ADADh to all the tracks (track: 0 to 39/0 to 79) on a floppy disk. The data is then read and compared to the original data.

Subtest 03 Random address/data

This subtest writes random data to random addresses on all tracks (track: 0 to 39/0 to 79) on a floppy disk. The data is then read and compared to the original data.

Subtest 04 Write specified address

This subtest writes the data specified by an operator to a specified track, head and address.

Subtest 05 Read specified address

This subtest reads data from a track, head and address specified by an operator.

3.11 Printer Test

NOTE: Printer Test is not supported for this model.

To execute the Printer Test, select **6** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen.

NOTE: An IBM compatible printer must be connected to the system to execute this test. Also, printer port wraparound connector must be connected.

The following message will appear, after selecting the subtest 01 to 03 of the printer test:

```
channel#1 = XXXXh
channel#2 = XXXXh
channel#3 = XXXXh
```

Select the channel number (1-3) ?

The printer I/O port address is specified by the XXXXh number. The computer supports three printer channels. Select the printer channel number, and press **Enter** to execute the selected subtest.

Subtest 01 Ripple pattern

This subtest prints characters for codes 20h through 7Eh line-by-line while shifting one character to the left at the beginning of each new line.

```
! "$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
! "$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnop
" "$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqr
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrst
E'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstu
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuv
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvw
)+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvwx
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNopqrstuvwxyz[\]^_`abcdefghijklmnopqrstuvwxy
```

Subtest 02 Function

This subtest is for IBM compatible printers, and tests the following functions:

Normal print
 Double-width print
 Compressed print
 Emphasized print
 Double-strike print
 All characters print

This subtest prints the various print types shown below:

```

PRINTER TEST
1.  THIS LINE SHOWS NORMAL PRINT.
2 . THIS LINE SHOWS DOUBLE-WIDTH PRINT .
3.  THIS LINE SHOWS COMPRESSED PRINT.
4.  THIS LINE SHOWS EMPHASIZED PRINT.
5.  THIS LINE SHOWS DOUBLE-STRIKE PRINT.
6.  ALL CHARACTERS PRINT
    !"#$$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
    OPQRSTUVWXYZ[\]^_`abcdefghijklmnop
    qrstuvwxyz{|}~
  
```

Subtest 03 Wraparound

NOTE: *To execute this subtest, a printer wraparound connector must be connected to the computer's printer port.*

This subtest checks the output and bi-directional modes of the data control and status lines through the parallel port wraparound connector (34M741986G01). (Both output and bi-directional modes are tested.)

3.12 Async Test

NOTE: Async Test is not supported for this model.

To execute the Async Test, select **7** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions displayed on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 and 02 require the following data format:

Method : Asynchronous
Speed : 38400BPS
Data : 8 bits and one parity bit (EVEN)
Data pattern : 20h to 7Eh

Subtest 01 FIR/SIR point to point (send)

NOTE: To execute subtests 01 and 02, each computer must have access to the other computer's infrared port.

This subtest sends 20h through 7Eh data to the receive side, then receives the sent data and compares it to the original data through the FIR/SIR port.

Subtest 02 FIR/SIR point to point (receive)

This subtest is used with subtest 01 described above. This subtest receives the data from the send side, then sends the received data through the FIR/SIR port.

Subtest 03 Wraparound (board)

NOTE: To execute this subtest, a RS-232C wraparound connector must be connected to the RS-232C port.

This subtest checks the data send/receive function through the wraparound connector.

3.13 Hard Disk Test

To execute the Hard Disk Test, select **8** from the DIAGNOSTIC TEST MENU, press **Enter**, and follow the directions on the screen.

CAUTION: *The contents of the hard disk will be erased when subtest 02, 03, 04, 06, 08 or 09 is executed. Before running the test, the customer should transfer the contents of the hard disk to floppy disk or another hard disk. If the customer has not or can not perform the back-up, create back-up disks as described below.*

Check to see if the Microsoft Create System Disks Tools (MSCSD.EXE) still exists in the System Tools Folder. (This tool can be used only once.) If it exists, use it to back up the pre-installed software, then use the Backup utility in the System Tools folder to back up the entire disk, including the user's files.

Refer to the operating system instructions.

1. The following message appears for the error dump operation when a data compare error is detected. Select **1** or **2**.

Data compare error dump (1:no, 2:yes)

2. The following message appears for whether or not the HDC status is displayed on the screen. The HDC status is described in section 3.19. Select **1** or **2**.

Detail status display (1:no, 2:yes)

3. The Hard Disk Test message will appear after you respond to the Detail Status prompt. Select the number of the subtest you want to execute and press Enter. The following message will appear during each subtest.

HARD DISK TEST XXXXXXXX

XXX DIAGNOSTIC TEST VX.XX [Ctrl]+[Break] : test end [Ctrl]+[C] : key stop

SUB TEST	:	XX			
PASS COUNT	:	XXXXX	ERROR COUNT	:	XXXXX
WRITE DATA	:	XX	READ DATA	:	XX
ADDRESS	:	XXXXXX	STATUS	:	XXX

The first three digits of the ADDRESS indicate which cylinder is being tested, the fourth digit indicates the head number and the last two digits indicate the sector number.

The first digit of the STATUS indicates the drive being tested and the last two digits indicate the error status code as explained in the table 3-2 of the section 3.18.

Subtest 01 Sequential read

This subtest is a sequential reading of all the tracks on the HDD starting at track 0. When all the tracks on the HDD have been read, the test starts at the maximum track and reads the tracks on the HDD sequentially back to track 0.

Subtest 02 Address uniqueness

This subtest writes unique address data to each sector of the HDD track-by-track. The data written to each sector is then read and compared with the original data. There are three ways the HDD can be read:

1. Forward sequential
2. Reverse sequential
3. Random

Subtest 03 Random address/data

This subtest writes random data in a random length to random addresses. This data is then read and compared to the original data.

Subtest 04 Cross talk & peak shift

This subtest writes eight types of worst pattern data (listed below) to a cylinder and then reads the data while moving from cylinder to cylinder. (Tests the data interference in the neighbor track.)

Worst pattern data	Cylinder
'B5ADAD'	0 cylinder
'4A5252'	1 cylinder
'EB6DB6'	2 cylinder
'149749'	3 cylinder
'63B63B'	4 cylinder
'9C49C4'	5 cylinder
'2DB6DB'	6 cylinder
'D24974'	7 cylinder

Subtest 05 Partial Read

This subtest reads 1GB data which is in minimum, middle and maximum address of the HDD area.

Subtest 06 Write specified address

This subtest writes specified data to a specified cylinder and head on the HDD.

Subtest 07 Read specified address

This subtest reads data, which has been written to a specified cylinder and head on the HDD.

Subtest 08 Sequential write

This subtest writes specified 2-byte data to all of the cylinders on the HDD.

Subtest 09 W-R-C specified address

This subtest writes data to a specified cylinder and head on the HDD, then reads the data and compares it to the original data.

3.14 Real Timer Test

To execute the Real Timer Test, select **9** from the DIAGNOSTIC TEST MENU, press **Enter** and follow the directions on the screen. Move the highlight bar to the subtest you want to execute and press **Enter**.

Subtest 01 Real time

A new date and time can be input during this subtest. To execute the real time subtest, follow these steps:

1. Select subtest 01 and the following messages will appear:

```
Current date : XX-XX-XXXX
Current time : XX:XX:XX
```

```
Enter new date:
```

```
PRESS [ENTER] KEY TO EXIT TEST
```

2. If the current date is not correct, input the correct date at the “Enter new date” prompt and press **Enter**.

3. The following messages will appear:

```
Current date : XX-XX-XXXX
Current time : XX:XX:XX
```

```
Enter new time:
```

```
PRESS [ENTER] KEY TO EXIT TEST
```

4. If the current time is not correct, input the correct time in 24-hour format. To enter “:”, press **Shift + ;**. The time is updated.

To exit the test, press **Enter**.

Subtest 02 Backup memory

This subtest checks the following backup memories:

Writes 1-bit of “on” data (01h through 80h) to address 0Eh through 7Fh

Writes 1-bit of “off” data (FEh through 7Fh) to address 0Eh through 7Fh

Writes the data pattern AAh and 55h to the address 0Eh to 7Fh

Then the subtest reads and compares this data with the original data.

Subtest 03 Real time carry

CAUTION: When this subtest is executed, the current date and time are erased.

This subtest checks the real time clock increments, making sure the date and time are displayed in the following format:

```
Current date : 12-31-1999
Current time : 23:59:58
```

The real time increments are automatically executed and the following is displayed:

```
Current date : 01-01-2000
Current time : 00:00:00
```

```
PRESS [Enter] KEY TO EXIT TEST
```

To exit the test, press **Enter**.

3.15 NDP Test

To execute the NDP test, select **10** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

Subtest 01 NDP

This test checks the following functions of NDP:

- Control word
- Status word
- Bus
- Addition
- Multiplication

3.16 Expansion Test

To execute the expansion test, select **11** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

Subtest 01 PCMCIA wraparound

CAUTION: PCMCIA wraparound test is not supported for this model.

NOTE: To execute this subtest, the PC card wraparound connector is required.

This subtest checks the following signal line of the PC card slot:

- Address line
- REG#, CE#1, CE#2 line
- Data line
- Speaker line
- Wait line
- BSY#, BVD1 line

This subtest is executed in the following order:

Sub#	Address	Good	Bad	Contents
01	00001 00001	nn nn	xx xx	Address line REG#, CE#1, CE#2 nn=A0, 90, 80, 00
02	00002	ww	rr	Data line ww=write data, rr=read data
03	00003	—	—	Speaker line
04	00004	40,80	xx	Wait line (40<xx<80)
05	00005	nn	xx	Other lines (BSY#, BVD1) NN=21, 00

NOTE: Select the subtest number 01, The following message will appear:
Test slot number select (1:slot0, 2:slot1, 0:slot0&1)?

Subtest 02 RGB monitor ID

NOTE: To execute this subtest, an external monitor with monitor ID function is required.

Connect the external monitor to the PC for the test of ID acquisition.

The judgment of acquisition is based on the panel data. In simultaneous display mode or internal display mode, in which the panel data is acquired, this subtest will fail. Therefore, make sure only the external display is selected when executing this subtest.

3.17 CD-ROM/DVD-ROM Test

To execute the CD-ROM/DVD-ROM test, select **12** from the DIAGNOSTICS TEST MENU, press **Enter** and follow the directions on the screen.

NOTE: For the subtest 01, 02 and 03, use the TOSHIBA CD-ROM TEST DISK TDY-01 or ABEX TEST CD-ROM TCDR-702 and DVD-ROM TEST DISK TSD-1. For the subtest 04, use a CD-RW on the market.

Subtest 01 Sequential read

This subtest is a sequential reading of one-block units (2K bytes) of all the logical addresses.

Subtest 02 Read specified address

This subtest reads one-block data from a specified address.

Subtest 03 Random address/data

This subtest reads one-block data and multi-block data from random addresses 200 times.

Subtest 04 RW 1point W/R/C

This subtest writes, reads and compares data at one point on a CD/RW media.

3.18 Error Code and Error Status Names

Table 3-2 lists the error codes and error status names for the DIAGNOSTIC TEST.

Table 3-2 Error codes and error status names (1/3)

Device name	Error code	Error status name
(Common)	FF	Data Compare Error
System	01 03 04 05 06 07 08 09 10	ROM - CHECKSUM ERROR ROM - SERIAL ID WRITE ERROR ROM - NOT SUPPORTED PS-SYSTEM ROM - SENSING ERROR(AC-ADAPT) ROM - SENSING ERROR(1st Batt) ROM - SENSING ERROR(2nd Batt) ROM - THORMISTOR ERROR(1) ROM - THORMISTOR ERROR(2) ROM - THORMISTOR ERROR(3)
Memory	01 02 DD	RAM - PARITY ERROR RAM - PROTECTED MODE NO CHANGE' RAM - CACHE MEMORY ERROR
Keyboard	FE FD F0 F1 F2 F3 F4 F5 F6 F7 F8 F9 FA EF ED	USB - GET DESCR.ERROR (FIRST) USB - SET ADDRESS ERROR HUB - GET DESCR.ERROR(Top 8B) HUB - GET DESCR.ERROR (Whole) HUB - SET CONFIGURATION ERROR HUB - GET DESCR.ERROR(DESCR.) HUB - SET FEATURE ERROR(P ON) HUB - GET STATUS ERROR HUB - SET FEATURE ERROR(RESET) HUB - CLEAR FEATURE ERROR HUB - CLEAR FEATURE1 ERROR HUB - SET FEATURE ERROR(Enab.) HUB - CLEAR FEATURE2 ERROR USB - OVER CURRENT ERROR USB - GET DESCR.ERROR(SECOND)
Display	EE	VRAM SIZE NOT SUPPORT

Table 3-2 Error codes and error status names (2/3)

Device name	Error code	Error status name
FDD	01 02 03 04 08 09 10 20 40 80 60 06 EE	FDD - BAD COMMAND ERROR FDD - ADDRESS MARK NOT FOUND FDD - WRITE PROTECTED FDD - RECORD NOT FOUND FDD - DMA OVERRUN ERROR FDD - DMA BOUNDARY ERROR FDD - CRC ERROR FDD - FDC ERROR FDD - SEEK ERROR FDD - TIME OUT ERROR FDD - NOT DRIVE ERROR FDD - MEDIA REMOVED FDD - WRITE BUFFER ERROR
Printer	01 08 10 20 40 80	PRT - TIME OUT PRT - FAULT PRT - SELECT LINE PRT - OUT OF PAPER PRT - POWER OFF PRT - BUSY LINE
ASYNC	01 02 04 08 10 20 40 80 88 05 06	RS232C - [DTR ON] TIME OUT RS232C - [CTS ON] TIME OUT RS232C - [RX READY] TIME OUT RS232C - [TX FULL] TIME OUT RS232C - PARITY ERROR RS232C - FRAMING ERROR RS232C - OVERRUN ERROR RS232C - LINE STATUS ERROR RS232C - MODEM STATUS ERROR SIR - TIME OUT ERROR FIR - TIME OUT ERROR
HDD	05 07 09 0B BB 08 01 02 04 10 20 40 80 11 AA	HDD - HDC NOT RESET ERROR HDD - DRIVE NOT INITIALIZE HDD - DMA BOUNDARY ERROR HDD - BAD TRACK ERROR HDD - UNDEFINED ERROR HDD - OVERRUN ERROR (DRQ ON) HDD - BAD COMMAND ERROR HDD - ADDRESS MARK NOT FOUND HDD - RECORD NOT FOUND ERROR HDD - ECC ERROR HDD - HDC ERROR HDD - SEEK ERROR HDD - TIME OUT ERROR HDD - ECC RECOVER ENABLE HDD - DRIVE NOT READY

Table 3-2 Error codes and error status names (3/3)

Device name	Error code	Error status name
(HDD)	CC E0 0A EE DA 12	HDD - WRITE FAULT HDD - STATUS ERROR HDD - BAD SECTOR HDD - ACCESS TIME ERROR HDD - NO HDD HDD - DMA CRC ERROR
NDP	01 02 03 04 05 06	NDP - NO CO-PROCESSOR NDP - CONTROL WORD ERROR NDP - STATUS WORD ERROR NDP - BUS ERROR NDP - ADDITION ERROR NDP - MULTIPLAY ERROR
EXPANSION	C1 C3 C4 C5 C6 C7 C8 CB CC CE CF	ADDRESS LINE ERROR CE#1 LINE ERROR CE#2 LINE ERROR DATA LINE ERROR WAIT LINE ERROR BSY# LINE ERROR BVD1 LINE ERROR ZV-Port ERROR NO PCMCIA CARD TYPE ERROR ZV_CONT# ERROR
CD-ROM /DVD-ROM	01 02 03 04 05 06 09 11 20 40 80 90 B0	BAD COMMAND ILLEGAL LENGTH UNIT ATTENTION MEDIA CHANGE REQUEST MEDIA DETECTED ADDITIMAL SENSE BOUNDARY ERROR CORRECTED DATA ERROR DRIVE NOT READY SEEK ERROR TIME OUT RESET ERROR ADDRESS ERROR

3.19 Hard Disk Test Detail Status

When an error occurs in the hard disk test, the following message is displayed:

```
HDC status = XXXXXXXX
```

Detailed information about the hard disk test error is displayed on the screen by an eight-digit number. The first four digits represent the hard disk controller (HDC) error status number and the last four digits are not used.

The hard disk controller error status is composed of two bytes; the first byte displays the contents of the HDC status register in hexadecimal form and the second byte displays the HDC error register.

The contents of the HDC status register and error register are listed in Tables 3-3 and 3-4.

Table 3-3 Hard disk controller status register contents

Bit	Name	Description
7	BSY (Busy)	"0" ... HDC is ready. "1" ... HDC is busy.
6	DRY (Drive ready)	"0" ... Hard disk drive is not ready to accept any command. "1" ... Hard disk drive is ready.
5	DWF (Drive write fault)	"0" ... DWF error is not detected. "1" ... Write fault condition occurred.
4	DSC (Drive seek complete)	"0" ... The hard disk drive heads are not settled over a track. "1" ... The hard disk drive heads are settled over a track.
3	DRQ (Data request)	"0" ... Drive is not ready for data transfer. "1" ... Drive is ready for data transfer.
2	COR (Corrected data)	"0" ... Not used "1" ... Correctable data error is corrected.
1	IDX (Index)	"0" ... Not used "1" ... Index is sensed.
0	ERR (Error)	"0" ... Normal "1" ... The previous command was terminated with an error.

Table 3-4 Error register contents

Bit	Name	Description
7	BBK (Bad block mark)	"0" ... Not used. "1" ... A bad block mark is detected.
6	UNC (Uncorrectable)	"0" ... There is no uncorrectable data error. "1" ... Uncorrectable data error has been detected.
5	—	Not used.
4	IDN (Identification)	"0" ... Not used. "1" ... There is no ID field in the requested sector.
3	—	Not used
2	ABT (Abort)	"0" ... Not used. "1" ... Illegal command error or command abort.
1	TK0 (Track 0)	"0" ... The hard disk found track 0 during a recalibrate command. "1" ... The hard disk could not find track 0 during a recalibrate command.
0	—	Not used.

3.20 ONLY ONE TEST

3.20.1 Program Description

This program tests the unique functions of this model.

3.20.2 Operations

Select test **2** from the DIAGNOSTIC MENU and press **Enter**. The following menu appears in the display.

```
#####
#####          ONLY ONE TEST Menu (XXXXXXXX)          #####
#####
*
*  1 .....    Pressed Key Display                      *
*  2 .....    Touch Pad                                *
*  3 .....    Wireless communication switch            *
*  4 .....    USB                                       *
*  5 .....    LED                                       *
*  6 .....    Button                                    *
*  7 .....    Acceleration sensor                     *
*
*  9 .....    Exit to Common Test                      *
*
*****
.... Press test number [1-7,9] ?
```

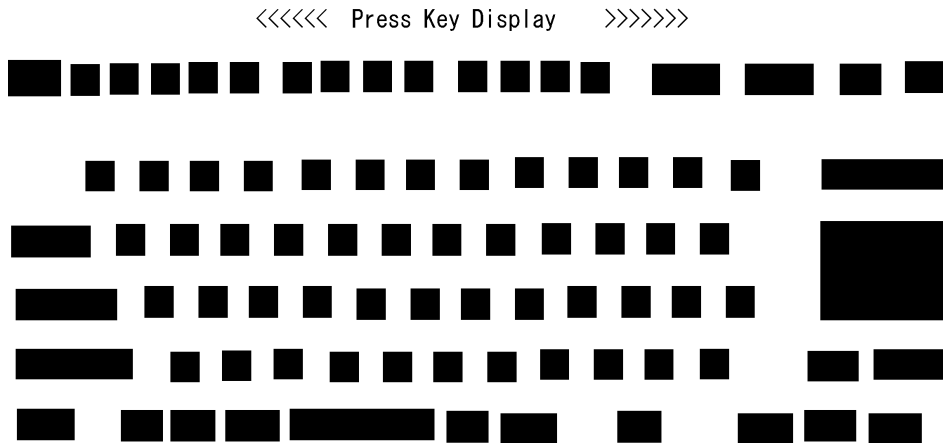
Select the subtest number you want to test and press **Enter**.

To return to the Common Test menu, select **9** and press **Enter**.

Subtest 01 Pressed key display

When you execute this subtest, the keyboard layout is drawn on the display as shown below. When any key is pressed, the corresponding key on the screen changes to the key character that was pressed. Holding a key down enables the auto-repeat function that causes the key's display character to blink.

Press **Del + Enter** to end the test.



IF TEST OK, Press [Del] [Enter] Key

NOTE: *The actual display may be different from the above image, according to the model.*

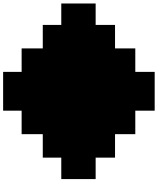

Subtest 02 Touch Pad

This subtest checks the functions of the touch pad as shown below.

- A) Direction and parameter
- B) Switching function check.



This test displays the response from the touch pad and touch pad switch. When moving your finger on the touch pad towards the upper left, the <POINTING> display changes according to the following illustration. If a touch pad switch is pressed, the <BUTTONS> displays appear on the right side one by one. The parameters appear above the <BUTTONS> (1) or (2) corresponding to the pressed touch pad switch highlights. To end this subtest, press two touch pad switches at the same time.

```

*** IPS TEST PROGRAM (Vx.xx) ***
<POINTING>                <PARAMETER>
                            STATUS:0000h
                            X-RATE:0000h
                            Y-RATE:0000H

                            <BUTTON>
                            (1)   (2)

<< PRESS BUTTON1+BUTTON2 THEN END >>

```

```

*** IPS TEST PROGRAM (Vx.xx) .***
< POINTING >              <PARAMETER>
                            STATUS:0018h
                            X-RATE:OK
                            Y-RATE:OK

                            <BUTTON>
                            (1)   (2)

<< PRESS BUTTON1+BUTTON2 THEN END >>

```

Subtest 03 Wireless communication switch

This subtest checks if the Wireless communication switch works properly.

If the test is started with the switch ON, following message appears in the display.

```
Wireless communication switch is set to a start position (OFF)
```

Slide the switch to OFF position. Then, following message appears in the display.

```
Wireless communication switch ON !!
```

Slide the switch to ON position. Then, following message appears in the display.

```
Wireless communication switch OFF !!
```

After Sliding the switch to OFF position, return to the ONLY ONE TEST menu automatically.

Subtest 04 USB

NOTE: When executing this subtest, USB test module and USB cable must be connected.

This subtest checks if USB port works properly.

The following menu appears in the display.

```
#####
##### ONLY ONE TEST Menu (XXXXXXXX) #####
#####
*
* 0 ..... Port 0 (Behind the right) *
* 1 ..... Port 1 (Behind the center) *
* 2 ..... Port 2 (Behind the left) *
* 9 ..... Exit *
*
*****
.... Press test number[0-2, 9] ?
```

Connect the USB test module and USB cable to the computer.

Input the port test number and press **Enter**.

OK message appears in the display if the test ends without fail.

NG message appears in the display if an error is found during the test.

Confirm the connection of cable, and then execute the test again.

Press **9** and **Enter** to return to ONLY ONE TEST menu.

Subtest 05 LED

This subtest checks if each LED lights properly.

The following message appears in the display in order. Follow the instructions in the display to execute the test.

[HDD Access LED test]

Press any key and following message appears in the display.

[Caps/Num/Overlay BT/W-LAN LED test]

- (1) Press [Caps Lock] key ! ...Caps (on/off)
- (2) Press [Fn + F10] key ! ...Arrow (on/off)
- (3) Press [Fn + F11] key ! ...Num (on/off)
- (4) Slide [BT/W-LAN switch L&R]! (on/off)

Confirm corresponding LED lights properly.

Press **Enter** and following message appears in the display.

Check [DC-IN]&[Power]&[Main Battery]LED= Green

Check if the color of the message changes orange to green alternately.

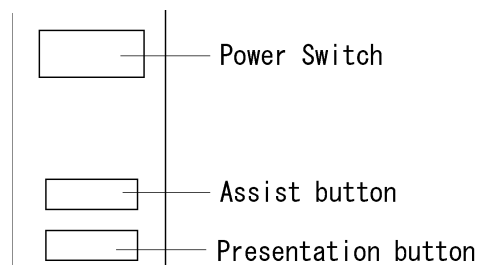
Press **Enter** and return to the ONLY ONE TEST menu.

Subtest 06 Button

This subtest checks the moving of the of the front operation panel button.

Press the Toshiba Presentation button after the following message appears.

Press [Assist] button



Press the Toshiba Assist button after the following message appears.

Press [Presentation] button

If the test ends successfully, the display returns to the ONLY ONE TEST menu.

Subtest 07 Acceleration sensor

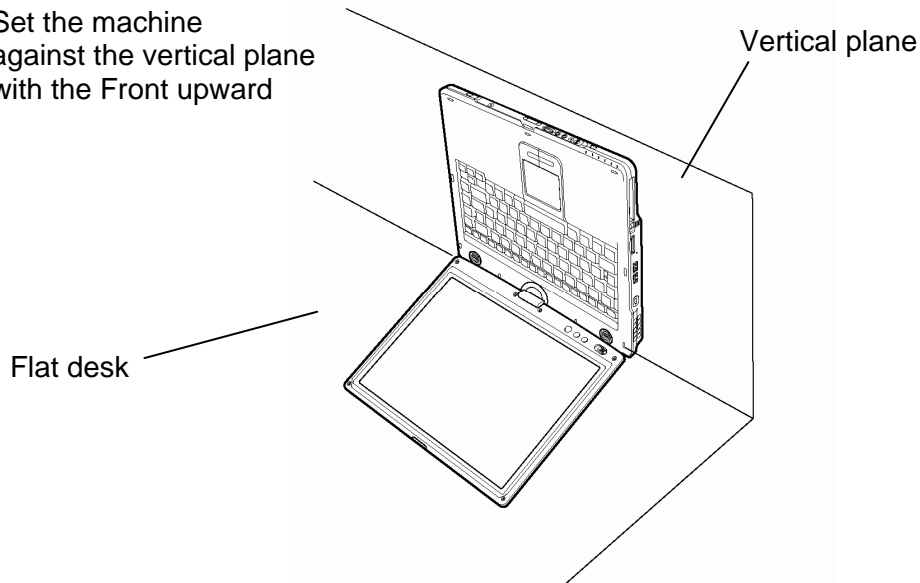
This subtest detects and corrects the each axis (X, Y, Z).

NOTE: Make sure that this subtest is executed on the following condition:

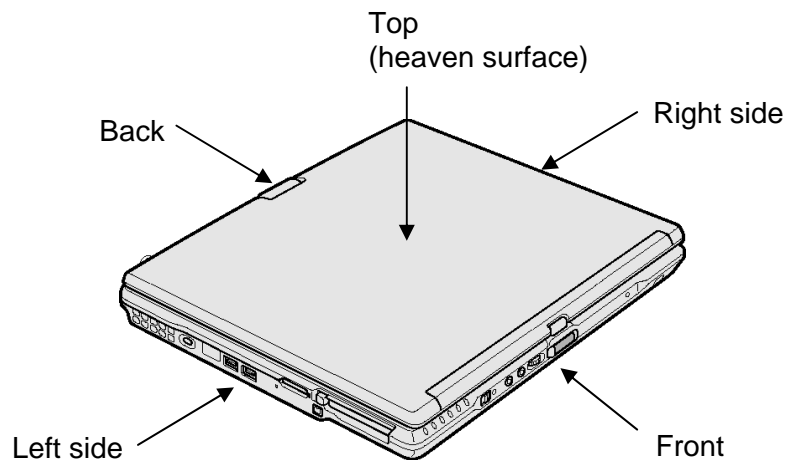
1. Flat desk with vertical plane to get the stability of machine.
2. The vertical wall or plane is necessary.
3. Prevent the machine from shake or shock.

<Example>

Set the machine
against the vertical plane
with the Front upward



The figure below shows the name and position of each side.



When this subtest is selected, the following message appears in the display.

The heaven surface establishes in the upper direction
Press [Enter] key

NOTE: Be sure to execute the test with the display panel opened.

Set the machine on the flat desk. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

The back establishes in the upper direction
Press [Enter] key

Set the machine against the vertical plane on the flat desk with the back of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

The right establishes in the upper direction
Press [Enter] key

Set the machine against the vertical plane on the flat desk with the right side of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

The front establishes in the upper direction
Press [Enter] key

Set the machine against the vertical plane on the flat desk with the front of machine upward. Then press **Enter** to detect the data on this setting of machine. The following message appears in the display.

The left establishes in the upper direction
Press [Enter] key

Set the machine against the vertical plane on the flat desk with the left side of machine upward. Then press **Enter** to detect the data on this setting of machine.

When there is no defective during the all checks above, the following message appears in the display. Then press **Enter** and return to the Only One Test menu.

** Setting OK! **
Press [Enter] key

When any trouble in the above setting is found, the following message appears and the test halts. Then press **Enter** and return to the Only One Test menu.

** Setting ERROR! **
Press [Enter] key

3.21 Head Cleaning

3.21.1 Function Description

This function cleans the heads in the FDD by executing a series of head load/seek and read operations. A cleaning kit is necessary to perform this program.

3.21.2 Operations

1. Selecting test **4** from the DIAGNOSTIC MENU and pressing **Enter** displays the following messages:

```
DIAGNOSTICS - FLOPPY DISK HEAD CLEANING : VX.XX  
Mount cleaning disk(s) on drive(s).  
Press any key when ready.
```

2. Remove the Diagnostics Disk from the FDD, then insert the cleaning disk and press **Enter**.
3. When the "cleaning start" message appears, the FDD head cleaning has begun.
4. The display automatically returns to the DIAGNOSTIC MENU when the program is completed.

3.22 Log Utilities

3.22.1 Function Description

This function logs error information generated while a test is in progress and stores the results in RAM. This function can store data on a floppy disk, or output the data to a printer or the display.

The error information is displayed in the following order:

1. Error count (CNT)
2. Test name, Subtest number (TS-No)
3. Pass count (PASS)
4. Error status (STS)
5. FDD/HDD or memory address (ADDR)
6. Write data (WD)
7. Read data (RD)
8. HDC status (HSTS)
9. Error status name (ERROR STATUS NAME)

If the power switch is turned off, the error information will be lost.

3.23 Running Test

3.23.1 Function Description

This function automatically executes the following tests in sequence:

1. System test (subtest 01)
2. Memory test (subtests 01, 02, 06)
3. Display test (subtest 01)
4. Real timer test (subtest 02)
5. HDD test (subtest 01)
6. ODD test (subtest 01)

The system automatically detects the number of floppy disk drives connected to the computer for the FDD test.

3.23.2 Operations

***NOTE:** After booting up the Running test, pull out the test program and insert a floppy disk which has been formatted by **FORMAT** command of DOS.*

1. Pull out the test program and insert a floppy disk which has been formatted by **FORMAT** command of DOS.
2. Select **6** from the DIAGNOSTIC MENU and press **Enter**, the following messages for selectable tests will appear in the display in order.

```
FDD write/read test (Y/N) ?  
Printer wrap around test (Y/N) ?  
Serial wrap around test (Y/N) ?  
CD-ROM/DVD-ROM read test (Y/N) ?
```

3. To execute the test, press **Y** and **Enter**. To cancel the test, press **N** and **Enter**. If you select the selectable tests, follow the instruction message in the display.
4. After selecting the selectable tests, the running test starts automatically. To terminate the program, press **Ctrl + Break**.

3.24 Floppy Disk Drive Utilities

3.24.1 Function Description

This function formats the FDD, copies the floppy disk and displays the dump list for both the FDD and HDD.

1. FORMAT

NOTE: *This program is only for testing a floppy disk drive. It is different from the Toshiba DOS FORMAT command.*

This program can format a floppy disk in the following formats:

- (a) 2DD: Double-sided, double-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 9 sectors/track.
- (b) 2HD: Double-sided, high-density, double-track, 96/135 TPI, MFM mode, 512 bytes, 18 sectors/track.

2. COPY

This program copies data from a source floppy disk to a target floppy disk.

3. DUMP

This program displays the contents of the floppy disk and the designated sectors of the hard disk on the display.

4. HDD ID READ

This program reads the hard disk ID and displays hard disk information.

3.24.2 Operations

1. Selecting **7** from the DIAGNOSTIC MENU and pressing **Enter** displays the following message.

```
[ FDD UTILITIES ]

1 - FORMAT
2 - COPY
3 - DUMP
4 - HDD-ID READ
9 - EXIT TO DIAGNOSTICS MENU
```

2. FORMAT program

- (a) Selecting FORMAT displays the following message.

```
DIAGNOSTICS - FLOPPY DISK FORMAT : VX.XX
Drive number select (1:A, 2:B) ?
```

- (b) Select a drive number to display the following message.

```
Type select (0:2DD, 3:2HD) ?
```

- (c) Select a media/drive type number and press **Enter**. A message similar to the one below will be displayed.

```
Warning : Disk data will be destroyed.
Insert work disk into drive A:
Press any key when ready.
```

- (d) Remove the Diagnostics Disk from the FDD, insert the work disk and press any key.

The following message will be displayed when the FDD format is executed.

```
[ FDD TYPE ] : TRACK   = XXX
[ FDD TYPE ] : HEAD    = X
[ FDD TYPE ] : SECTOR  = XX

Format start

[[track, head = XXX X]]
```

After the floppy disk is formatted, the following message will appear.

```
Format complete
Another format (1:Yes/2:No) ?
```

- (e) Typing **1** displays the message from step (c) above. Typing **2** returns the test to the DIAGNOSTIC MENU.

3. COPY program

- (a) When COPY is selected, the following message appears.

```
FLOPPY DISK FORMAT & COPY : VX.XX
Type select (0:2DD,3:2HD) ?
```

- (b) Selecting a media/drive type number will display a message similar to the one below.

```
Insert source disk into drive A:
Press any key when ready.
```

- (c) Remove the Diagnostics Disk from the FDD, insert the source disk and press any key. The following message will appear, indicating the program has started.

```
[ FDD TYPE ] : TRACK      = XXX
[ FDD TYPE ] : HEAD       = X
[ FDD TYPE ] : SECTOR     = XX

Copy start
                [[ track,head = XXX X ]]
```

- (d) The following message will appear.

```
Insert target disk into drive A:
Press any key when ready.
```

- (e) Remove the source disk from the FDD, then insert a formatted work disk and press any key. The following message will appear and start copying to the target disk.

```
                [[ track,head = XXX X ]]
```

- (f) When the amount of data is too large to be copied in one operation, the message from step (b) is displayed again. After the floppy disk has been copied, the following message will appear.

```
Copy complete
Another copy (1:Yes/2:No) ?
```

- (g) To copy another disk, type **1** and the message from step (a) is displayed again. Entering **2** returns the test program to the DIAGNOSTIC MENU.

4. DUMP program

- (a) When DUMP is selected, the following message appears.

```
DIAGNOSTICS-HARD DISK & FLOPPY DISK DUMP : VX.XX
Drive type select (1:FDD, 2:HDD) ?
```

- (b) Select a drive type. If 2:HDD is selected, the display will go to step (h). If 1:FDD is selected, the following message will appear.

```
Select drive number (1:A, 2:B) ?
```

- (c) Select a drive number and the following message will be displayed.

```
Format type select (1:2DD, 3:2HD) ?
```

- (d) If 3:2HD is selected, the following message will appear. Select a media mode.

```
2HD media mode (1:1.20MB, 2:1.44MB, 3:1.23MB)?
```

- (e) The following message will appear.

```
Insert source disk into drive A:
Press any key when ready.
```

- (f) Insert a source disk and press any key and the following message will appear.

```
— Max. address —
[Track ] = XXXX
[Head  ] = XX
[Sector] = XX
Track number ?????
```

- (g) Set the track number, head number and sector number you want to dump. The system will access the disk and dump a list. Then the message shown in (k) will appear.

- (h) The following message will appear when selecting 2:HDD in (a).

```
Select drive number (1:C, 2:D) ?
```

- (i) Select a drive number and the following message will be displayed.

```
---Max. address ---
[LBA ] = XXXXXXXXXXXX
LBA number ??????????
```

- (j) Set the LBA number you want to dump. The system will access the disk and dump a list.

- (k) The following message will appear. To finish the dump, select **3**.

Press number key (1:up,2:down,3:end) ?

- (l) The following message will appear. Selecting **2** returns to the FDD UTILITIES MENU.

Another dump (1:Yes,2:No) ?

5. HDD ID READ program

Selecting HDD ID displays the following HDD ID configuration.

```
[HDD ID Read (VX.XX)] [Drive #1]
Model No.                = XXXXXXXX
Press [Enter] key
```

Press **Enter** to return to the FDD UTILITIES MENU.

3.25 System Configuration

3.25.1 Function Description

NOTE: To display the system configuration, the write protect tab should be *OFF* position. If the tab is *ON* position, move the tab to *OFF* position and restart the test. Otherwise the correct information cannot be acquired.

The System Configuration program contains the following configuration information for the computer:

1. Processor Type [Code/L2 cache]
2. Chip set [VRAM]
3. BIOS ROM version [1st ID, 2nd ID]
4. Boot ROM version
5. EC total version
6. PS Microprocessor version
7. Total Memory Size [Conventional memory]
8. Battery code
9. HWSC
10. FSB [Voltage]
11. The number of printer ports
12. The number of ASYNC ports
13. Math co-processors
14. Floppy Disk Drive [Track/Head/Sector]
15. Hard Disk Drive [Sector/Drive size/Manufacture code]
16. T&D total version
17. Date/Time

3.25.2 Operations

Select **8** from the DIAGNOSTIC MENU and press **Enter**. Then, the following system configuration appears in the display.

```
System Configuration Display : Ver X.XX [Machine Name ???]

* - Processor Type      = XXXXXX-XXXXXXMHz      Code = XX      L2 Cache = XXXXXXKB
* - Chip set           = XXXXXX                      VRAM = XXXXMB
* - BIOS ROM Version   = VX.XX      1st ID = XXH, 2nd ID = XXH
* - BOOT ROM Version   = VX.XX
* - EC Total Version    = VX.XX
* - PS Micon Version    = VX.XX
* - Total Memory Size   = XXXXXXMB (Conventional Memory = XXXXKB)
* - Battery Code       = XXXXXXXXXXXXX
* - HWSC               = XXXXXXXX
* - FSB                = XXXXXXMHz (Voltage = XEh)
* - X Printer Adapter   LPT1 = XXXX   LPT2 = XXXX   LPT3 = XXXX
* - X ASYNC Adapter     COM1 = XXXX   COM2 = XXXX   COM3 = XXXX
* - X Math CO-Processor
* - X USB Floppy Disk Drive(s) Track = XX   Head = XX, Sector = XX
* - X Hard Disk Drive(s) #1 Sectors = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXXXXX]
                       #2 Sectors = XXXXX, (XXXXX GB) [XXXXXXXXXXXXXXXXXXXX]

* - T&D Total Version   = VX.XX

Press [Enter] Key      [Date = XXXX-YY-ZZ, XX:YY:ZZ]
```

Press **Enter** to return to the DIAGNOSTIC MENU.

3.26 Wireless LAN Test Program (Atheros)

This section describes how to perform the wireless LAN transmitting-receiving test with the test program.

NOTE: Use another computer (with Atheros 11b/g (XB61L)/ Atheros 11a/b/g (MB62L)) that can communicate by the wireless LAN as a responder machine to perform this test.

The computer must be booted by the Responder T&D.

In this test, the following items are tested:

- (1) SKU check of Module
- (2) MAC Address Check
- (3) Communication test of 11a mode
- (4) Communication test of 11b mode
- (5) Communication test of 11g mode
- (6) SKU & MAC Check, 11a/b/g communication test

NOTE: This test take time until it completes.

To start the Wireless LAN test program, follow the steps below:

NOTE: Before starting the wireless LAN test, make sure the Wireless Communication Switch of the computer is turned on. (The Wireless Communication LED lights orange.)

3.26.1 Setting the responder machine

1. MB44ag is installed
 - 1) Boot the computer by MB4x Responder media.
 - 2) The Responder T&D is automatically started.
2. MB6x is installed

As the capacity of MB6x T&D is over the one of a FD, a RAM drive is used.

- 1) Boot the computer by MB6x Responder media.
- 2) After starting the OS, following message is displayed. input **m** and press **Enter**.

```

*****
*
*      Atheros MB4x/MB5x/MB6x Maintenance T&D Menu      *
*
*      s : Atheros MB4x DUT mode                          *
*
*      Please exchange FD for MB4x DUT media             *
*
*      h : Atheros MB5x DUT mode                          *
*
*      Please exchange FD for MB5x DUT media             *
*
*      r : Atheros MB5x Responder mode                    *
*
*      Please exchange FD for MB5x Responder media       *
*
*      m : Atheros MB6x setup mode                        *
*
*****

```

Please input the (s / h / r / m) key and push the "Enter" key :

- 3) The RAM drive name which has been set at booting is displayed and command input is requested. Input **mb6x X** and press **Enter**. The part of **X** is the RAM drive name. In the following display, it is "C".

```

          1,440 (1K) C:      Installed Device=RAMDRIVE
Please input the following command. "mb6x X" > mb6x c [Enter]

```

- 4) The following message is displayed. Change the FD with "MB6x setup media 1" and press **Enter**. The file copy from the FD to the RAM drive is started.

```

Please exchange FD for "MB6x setup media 1"
Press any Key to continue . . .

```

- 5) The following message is displayed. Change the FD with "MB6x setup media 2" and press **Enter**. The file copy from the FD to the RAM drive is started.

```

Please exchange FD for "MB6x setup media 2"
Press any Key to continue . . .

```

- 6) When the file copy is completed, the following test menu is displayed. Press **r**. The Responder T&D is started.

```
*****
*
*   Atheros MB6x DUT mode Maintenance T&D Menu   *
*
*   d : DUT mode                                 *
*
*   r : Responder mode                           *
*
*****

SELECT MODE No. (d or r) :
```

3.26.2 Test procedure

The following procedures show how to start the computer of DUT side.

- 1) Boot the computer by Atheros T&D boot media.
- 2) After displaying the following menu, input **m** and press **Enter**.

```
*****
*
*   Atheros MB4x/MB5x/MB6x Maintenance T&D Menu   *
*
*   s : Atheros MB4x DUT mode                       *
*
*   Please exchange FD for MB4x DUT media          *
*
*   h : Atheros MB5x DUT mode                       *
*
*   Please exchange FD for MB5x DUT media          *
*
*   r : Atheros MB5x Responder mode                 *
*
*   Please exchange FD for MB5x Responder media    *
*
*   m : Atheros MB6x setup mode                     *
*
*****
```

Please input the (s / h / r / m) key and push the "Enter" key :

- 2) The RAM drive name which has been set at booting is displayed and command input is requested. Input **mb6x X** and press **Enter**. The part of **X** is the RAM drive name. In the following display, it is "C".

```
1,440 (1K) C:   Installed Device=RAMDRIVE
Please input the following command. "mb6x X" > mb6x c [Enter]
```

- 3) The following message is displayed. Change the FD with "MB6x setup media 1" and press **Enter**. The file copy from the FD to the RAM drive is started.

```
Please exchange FD for "MB6x setup media 1"
Press any Key to continue . . .
```

- 4) The following message is displayed. Change the FD with “MB6x setup media 2” and press **Enter**. The file copy from the FD to the RAM drive is started.

```
Please exchange FD for "MB6x setup media 2"
Press any Key to continue . . .
```

- 5) When the file copy is completed, the following test menu is displayed. Press **d** and **Enter**. The Responder T&D is started.

```
*****
*
*   Atheros MB6x DUT mode Maintenance T&D Menu   *
*
*       d : DUT mode                               *
*
*       r : Responder mode                         *
*
*****
```

```
SELECT MODE No.(d or r) :
```

- 6) The following test menu is displayed. Select the test number.

```
*****
*   Atheros MB6x DUT mode Maintenance T&D Menu   *
*   1 : SKU check of Module                       *
*   2 : MAC Address Check                         *
*   3 : Communication test of 11a mode            *
*   4 : Communication test of 11a mode(Main Antenna Only) *
*   5 : Communication test of 11b mode            *
*   6 : Communication test of 11b mode(Main Antenna Only) *
*   7 : Communication test of 11g mode            *
*   8 : Communication test of 11g mode(Main Antenna Only) *
*   9 : All the tests of module                   *
*       (SKU & MAC Check,11a/b/g communication test) *
*   A : All the tests of module(Main Antenna Only) *
*       (SKU & MAC Check,11a/b/g communication test) *
*****
```

```
SELECT TEST No.(1-A) :
```

3.26.3 Contents of the test and errors

1. SKU check of Module

The SKU (destination) of the Wireless LAN card installed is displayed. Visually check it.

```
*****
*
*   Module   : Atheros MB62HL (MoW)               *
*   G-code   : G360001Q210                       *
*
*****
```

When an error (read error of EEPROM date) has detected, the following is displayed.

```
-----ERROR-----
file bac.txt cannot be opened
```

2. MAC Address Check

The MAC address of the installed Wireless LAN card is checked. If it is not incorrect MAC address, the following is displayed.

```
*****
*                                     *
*   MAC Address Check : OK !!         *
*                                     *
*****
```

a. Case of All FF error

```
*****
*                                     *
*   Mac Address Check NG              *
*                                     *
*   FFFFFFF-FFFFFFh                  *
*                                     *
*****
```

b. Case of All 00 error

```
*****
*                                     *
*   Mac Address Check NG              *
*                                     *
*   000000-000000h                   *
*                                     *
*****
```

3. Communication test of 11a mode

The check of connection of 11a mode antenna and transmitting/receiving test are executed.

When the test has been finished normally, the following is displayed.

```
*****
*                                     *
*   11a Communication Test : OK !!   *
*                                     *
*****
```


When an error has detected, the following is displayed.

```

*****
*
* 11a Communication Test : NG !! *
*
* Please refer to log.txt *
*
*****

```

4. Communication test of 11b mode

The check of connection of 11b mode antenna and transmitting/receiving test are executed.

When the test has been finished normally, the following is displayed.

```

*****
*
* 11b Communication Test : OK !! *
*
*****

```

When an error has detected, the following is displayed.

```

*****
*
* 11b Communication Test : NG !! *
*
* Please refer to log.txt *
*
*****

```

5. Communication test of 11g mode

The check of connection of 11g mode antenna and transmitting/receiving test are executed.

When the test has been finished normally, the following is displayed.

```

*****
*
* 11g Communication Test : OK !! *
*
*****

```

When an error has detected, the following is displayed.

```

*****
*
* 11g Communication Test : NG !! *
*
* Please refer to log.txt *
*
*****

```

6. SKU & MAC Check 11a/b/g communication test

All the test is executed in the order of SKU check of Module, MAC Address Check, Communication test of 11a mode, Communication test of 11b mode and Communication test of 11g mode.

The check of connection of 11g mode antenna and transmitting/receiving test are executed.

3.27 Wireless LAN Test Program (Intel-made b/g, a/b/g)

This section describes how to perform the wireless LAN transmitting-receiving test (Intel-made 802.11 b/g or 802.11 a/b/g). To execute the wireless LAN test, use the Diagnostics disk for wireless LAN test.

Insert the Diagnostics disk for wireless LAN test into the Floppy Disk Drive. Turn on the power while pressing **U**.

The following menu appears in the display.

```
*****
*      Intel PRO/Wireless 3945ABG Network Connection      *
*                  Maintenance T&D Menu                  *
*                                                         *
*      1  : SKU check of Module                          *
*                                                         *
*      2  : MAC Address Check                            *
*                                                         *
*      3  : Antenna Check & communication test of 11b mode *
*                                                         *
*      4  : Communication test of 11a mode                *
*                                                         *
*      5  : Communication test of 11g mode                *
*                                                         *
*      6  : All the tests of 11a/b/g Card                 *
*            (SKU & MAC Check, 11a/b/g communication test) *
*                                                         *
*****
```

SELECT TEST No, (1-6):

To execute the subtest, input the subtest number and press **Enter**.

Subtest01 SKU check of module

This subtest displays SKU information on the wireless LAN card installed. Selecting this subtest, following message will appear in the display. Confirm if the right information on the wireless LAN card is described.

```
*****
*
*      Module   : Module : Intel PRO/Wireless 3945ABG      *
*                  Network Connection (Mowl)              *
*      G-code   : G360001U110                             *
*      TA No.   : D26539                                   *
*
*****
```

Press any key and return to the test menu.

If a defective is found during the test, **NG** message will appear in the display.

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card
- Using a wrong wireless LAN card (Using unspecified card)
- Defective wireless LAN card

Checking the connection, execute the subtest again.

Subtest02 MAC Address Check

This subtest displays the MAC address. Selecting this subtest, following message will appear in the display.

```
*****MAC CHECK*****
MAC = XXXXXXXXXXXX
*****
*
* MAC Address Check : OK !!
*
*****
```

Press any key and return to the test menu.

If a defective is found during the test, following message will appear in the display.

```
*****MAC CHECK*****
ERROR: MAC all F
MAC = XXXXXXXXXXXX
*****
*
* MAC Address Check : NG !!
*
*****
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest03 Antenna check & communication test of 11b mode

This subtest execute transmitting/receiving test in 802.11b mode using the main antenna first. If a defective is not found during the test, transmitting/receiving test in 802.11b mode using the AUX antenna is automatically executed.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

If a defective is found during the test, **NG** message will appear in the display. When pressing any key, the following message (which antenna is defective) is displayed

```
*****
*
*   Main Antenna Test : NG !!
*
*****
*****
*
*   Aux Antenna Test : NG !!
*
*****
```

Press any key and return to the test menu.

Subtest04 Communication test of 11a mode

This subtest execute transmitting/receiving test in 802.11a mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

If a defective is found during the test, **NG** message will appear in the display. When pressing any key, the following message is displayed

```
*****
*
*       11a Communication Test : NG !!
*
*****
```

Press any key and return to the test menu.

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest05 Communication test of 11g mode

This subtest execute transmitting/receiving test in 802.11g mode using the main antenna.

If a defective is not found during the test, **OK** message will appear in the display. Press any key and return to the test menu.

If a defective is found during the test, **NG** message will appear in the display. When pressing any key, the following message is displayed

```

*****
*                                     *
*           11g Communication Test :  NG !!           *
*                                     *
*****

```

When a defective is detected in the test, following typical cause is considered.

- Connection of wireless LAN card
- Defective wireless LAN card
- Disappearance of MAC address data

Checking the connection, execute the subtest again.

Subtest06 All the tests of 11a/b/g Card

All the tests is executed in the order of SKU check of Module, MAC Address Check, Communication test of 11b mode, Communication test of 11a mode and Communication test of 11g mode.

When any error has detected, the test finishes.

3.28 LAN/Modem/Bluetooth/IEEE1394 Test Program

This section describes how to perform the LAN/Modem/Bluetooth/IEEE1394 test with the test program.

Insert the test program disk for LAN/Modem/Bluetooth/IEEE1394 test in FDD and turn on the power. The following message will appear:

```
Microsoft Windows XX Startup Menu
-----
```

1. LAN
2. Modem
3. Bluetooth
4. IEEE1394

Enter a choice:

Press the number you want to test and press **Enter**.

NOTE: It is impossible to go back to startup menu once you choose the test. Therefore, LAN/Modem/Bluetooth/IEEE1394 test can not be executed successively.

3.28.1 LAN test

To execute LAN test, press **1** and **Enter**. The following message will appear:

```
#####
##### i82562 ICHx GbE (i82540) Diagnostics program #####
#####
*
* 1 ..... (i82562 + ICHx) *
*
* 2 ..... (GbE) *
*
* 3 ..... (Marvel) *
*
*****
.... Press test number [1-2] ?
```

Press the number you want to test and press **Enter**.

Subtest01 (i82562 + ICHx)

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip.

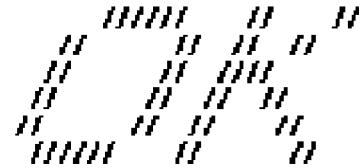
The following message will appear:

```
[LAN transmit & receive test !]
                                COMPLETED Repeat count = 00000
                                Error count   = 00000

LOOPBACK TEST

100Mbps Auto-negotiation TxRx Test
Destination Address   = xxxxxxxxxxxxxx
Source Address       = xxxxxxxxxxxxxx

** 100Base-TX Full-Duplex **
< TRANSMIT >
< RECEIVE >
```



NOTE: The menu displayed by your computer may be slightly different from the one shown above.

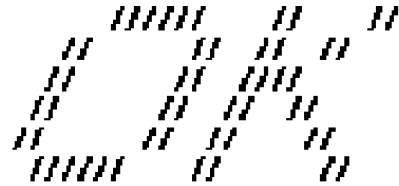
If a defective is found, **NG** message will appear in the display.

Subtest02 (GbE)

This subtest checks the operation of mini-PCI I/F by the loopback test in the chip. Select **2** to execute and press **Enter**.

The following message will appear:

```
Testing adaptor...hit <ESC> to abort.
*
External Loopback Test...PASSED
Testing completed.
*
*
Loopback Test Complete
*
*
* 1000Base Auto-negotiation TxRx Test
*
* CE Test Complete
```



NOTE: The menu displayed by your computer may be slightly different from the one shown above.

If a defective is found, **NG** message will appear in the display.

Subtest03 (Marvel)

NOTE: This Subtest is not supported in this computer.

3.28.2 Modem test

For this subtest, connect the modem PCB and RJ11 connector with a harness. Use the dedicated “FAT-MODE inspection device (product code: QE2000P01 made by Nitto Denki Seisakusyo)” for the tests.

```
#####
#####      AC97' Modem Controller Diagnostics program      #####
#####
*
*          1 ..... (ICHx)
*
*          2 ..... (ICH6)
*
*****
.... Press test number[1-2] ?
```

To execute Modem test, press **2** and **Enter**. Following message will appear:

```
[Modem loopback test !]
ICHx MDC Test Program with Modem Sound (Line Test)
Version X.X
* Scorpio Modem Initialize           :OK
* Digital Loopback Test              :OK
* RJ11 Connector Check (LED)        :(Operator's Check!!)
```

OK is displayed when a error is detected, **NG** is display when a error is not detected.

NOTE: *The menu displayed by your computer may be slightly different from the one shown above.*

RJ11 Connection Check (LED) (Operator's Check LED) test will be executed, and the following message will appear:

```
...Press Key (Y = OK , N =NG)
```

If the color in the LED of the connection checker is orange, press **Y**, otherwise, press **N**.

3.28.3 Bluetooth test

To execute this test, press **3** and press **Enter**.

***NOTE:** Use another computer that can communicate by the Bluetooth as a reference machine to perform this test.*

The following test is executed consecutively. The following Bluetooth test menu will appear:

```
#####
####      Bluetooth sub system test program VX.XX      ####
#####
*
*          1...BD_ADDR check                            *
*
*          3... Communications test (DUT mode)           *
*
*          T...communications test (TEST mode)          *
*
*****
...Press test number [1, 3, T] ?
```

Subtest01 BD_ADDR check

This subtest checks the BD_ADDR functions. When the Bluetooth test menu is displayed, press **1** to select the test and press **Enter**. The following message will appear:

```

-----
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
-----

Initializing ...

```

When the machine has passed the test, it displays BD_ADDR. If BD_ADDR has no problem, the following message is displayed.

```

-----
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
-----

My BD_ADDR = XXXXXXXXXXXX [h]

PPPPPP  A  SSSSS  SSSSS
P  P  A A  S  S  S  S
P  P  A  A  S  S
PPPPPP  A  A  SSSSS  SSSSS
P  AAAAAA  S  S
P  A  A  S  S  S  S
P  A  A  SSSSS  SSSSS

```

If the target machine has any problem, it displays Error CODE. The following message is displayed.

```

-----
Bluetooth Subsystem T&D for PCSE(BD_ADDR) VerX.XX Copyright (C) by TOSHIBA Co.
-----

My BD_ADDR = XXXXXXXXXXXX [h]

FFFFFF  A      III  L
F        A A    I    L
F        A  A   I    L
FFFFFF  A      A   I    L
F        AAAAAA I    L
F        A  A   I    L
F        A  A   III  LLLLLL

```

Table 3-5 Error message

Message	Contents
Invalid BD_ADDR (all 00)	0x000000000000
Invalid BD_ADDR (all FF)	0xFFFFFFFFFFFF
Invalid BD_ADDR (bit0=1)	bit40=1b
Invalid BD_ADDR (bit1=1)	bit41=1b
Invalid BD_ADDR (define in the file)	Defined BD_ADDR

If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-6 Error code for Bluetooth test (BD_ADDR) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

See the Specification of the Bluetooth System for details.

When the Bluetooth test menu is displayed, press **T** to select the test and press **Enter** in the test machine. The following message will appear:

```

-----
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----
+-----+
|               |
|      Tester   |
|               |
+-----+

[ESC]:Finish Tester  [SPACE]:Start
Is DUT ready?

```

Then press **Space** to start the Bluetooth communication test.

When the machine has passed the test, it displays BD_ADDR of the DUT. If the connection with the tester is completed, the progress bar stops. The following message is shown.

```

-----
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----
+-----+
|      DUT      | BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+-----+

  CCCC   OOO   M   M PPPPPP L   EEEEE TTTTTT EEEEE DDDD
C  C  O  O MM  MM P   P L   E       T   E       D   D
C    O    O M M M M P   P L   E       T   E       D   D
C    O    O M  M  M PPPPPP L   EEEEE T   EEEEE D   D
C    O    O M   M P   L   E       T   E       D   D
C  C  O  O M   M P   L   E       T   E       D   D
  CCCC   OOO   M   M P   LLLLLL EEEEE T   EEEEE DDDD

Testing is finished

A>_

```


If the target machine has any problem, the following message “INCOMPLETE” is displayed with the Error Code.

```

-----
Bluetooth Subsystem T&D for PCSE(CS-Air) VerX.XX Copyright (C) by TOSHIBA Co.
-----

+-----+
|          DUT          |   BD_ADDR of the DUT = XXXXXXXXXXXXX [h]
+-----+

III N   N   CCCC   OOO   M   M P P P P P L   EEEEE TTTTTT EEEEE
I  NN   N C   C O   O MM   MM P   P L   E       T   E
I  N N   N C       O   O M M M M P   P L   E       T   E
I  N N   N C       O   O M M M P P P P P L   EEEEE T   EEEEE
I  N   N N C       O   O M   M P   L   E       T   E
I  N   NN C   C O   O M   M P   L   E       T   E
III N   N   CCCC   OOO   M   M P           LLLLLL EEEEE T   EEEEE

                                Testing is finished

_Press any key to continue. . .

```

If the machine detects a malfunction, it indicates the error code as shown below.

The error code begins with the least significant digit.

Error code

Table 3-7 Error code for Bluetooth test (BD_ADDR of the DUT) (1/2)

Error code	Meaning
0x01	Unknown HCI Command.
0x02	No Connection.
0x03	Hardware Failure.
0x04	Page Timeout.
0x05	Authentication Failure.
0x06	Key Missing.
0x07	Memory Full.
0x08	Connection Timeout.
0x09	Max Number Of Connections.
0x0a	Max Number Of SCO Connections To A Device.
0x0b	ACL Connection already exists.
0x0c	Command Disallowed.
0x0d	Host Rejected due to limited resources.
0x0e	Host Rejected due to security reasons.
0x0f	Host Rejected due to remote device is only a personal device.
0x10	Host Timeout.
0x11	Unsupported Feature or Parameter Value.
0x12	Invalid HCI Command Parameters.
0x13	Other End Terminated Connection: Used Ended Connection.
0x14	Other End Terminated Connection: Low Resources.
0x15	Other End Terminated Connection: About to Power Off.
0x16	Connection Terminated by Local Host.
0x17	Repeated Attempts.
0x18	Paring Not Allowed.
0x19	Unknown LMP PDU.
0x1a	Unsupported Remote Feature.
0x1b	SCO Offset Rejected.
0x1c	SCO Interval Rejected.
0x1d	SCO Air Mode Rejected.
0x1e	Invalid LMP Parameters.
0x1f	Unspecified Error.

See the Specification of the Bluetooth System in detail.

Table 3-7 Error code for Bluetooth test (BD_ADDR of the DUT) (2/2)

Error code	Meaning
0x20	Unsupported LMP Parameter Value.
0x21	Role Change Not Allowed.
0x22	LMP Response Timeout.
0x23	LMP Error Transaction Collision.
0x24	LMP PDU Not Allowed.
0x25	Not Exist
0x26	Not Exist
0x27	Not Exist
0x28	Not Exist
0x29	Not Exist
0x2a	Not Exist
0x2b	Not Exist
0x2c	Not Exist
0x2d	Not Exist
0x2e	Not Exist
0x2f	Not Exist

See the Specification of the Bluetooth System in detail.

Table 3-8 Common error code

Error code	Meaning
0x30	BT Control Status should be "Disable", but it is "Enable".
0x31	BT Control Status should be "Enable", but it is "Disable".
0x32	Power Status should be "OFF", but it is "ON".
0x33	Power Status should be "ON", but it is "OFF".
0x34	USB I/F Status should be "Attach", but it is "Detach".
0x35	USB I/F Status should be "Detach", but it is "Attach".
0x36	Wake-up Status should be non-"Assert", but it is "Assort".
0x37	Wake-up Status should be "Assert", but it is non-"Assort".
0x38	Switch Status should be "OFF", but it is "ON".
0x39	Switch Status should be "ON", but it is "OFF".
0x3a	Module dose not exist.
0x3b	Module exists. (not error)
0x3c	Command Line is wrong.
0x3d	Side band access driver is not resident.
0x3e	Bluetooth driver for DOS is not resident.
0x3f	Get Status function of Side band access driver is not normal.
0x40	No reply to inquiry
0x41	Device Descriptor can not be acquired. USB I/F is not normal.
0x42	Sideband reset timeout occurs.
0x43	Descriptor type is wrong.
0x44	Descriptor is acquired in spite of Detach condition.
0x45	Configuration file open is not normal.
0x46	Contents of Configuration file are wrong.
0x47	BD_ADDR is wrong (00)
0x48	BD_ADDR is wrong (FF)
0x49	BD_ADDR is wrong (bit0=1)
0x4a	BD_ADDR is wrong (bit1=1)
0x4b	BD_ADDR is wrong (address defined as an error)
0x4c	Suspended during Hard ware switch confirmation.
0x4d	RSSI value is less than the standard value.
0x4e	Holts
0x4f	(reserved)

Number 0x30 to 0x40 are common error codes of the test program.

3.28.4 IEEE1394 test

To execute this test, press **4** and **Enter**.

NOTE: Use another computer that can communicate by IEEE1394 (i. Link) cable as a reference machine to perform this test.

The following menu will appear:

```

*****
*****      IEEE1394[XXXXX] Diagnostics program      *****
*****
*                                                     *
*      1 ....(Transmit & Receive test)                *
*                                                     *
*      2 ....(Responder set)                          *
*                                                     *
*      3 ....(1394 GUID Display)                      *
*                                                     *
*****
.... Press test number[1-3] ?

```

To execute the TEST, select the test number you want to execute and press **Enter**.

Subtest01 Transmit & Receive test

NOTE: Before executing subtest 01, be sure to execute subtest 02 in the responder machine.

This program checks the data transporting between responder machine and target machine and compare them with the original data through the IEEE1394 cable.

Subtest 02 Responder set

This program is executed in the responder machine to initialize the responder machine with the IEEE1394 cable connected to the target machine before executing subtest 01.

Subtest 03 1394 GUID Display

This program checks the GUID of IEEE1394.

3.29 Sound Test program

This section describes how to perform the Sound test. To execute the sound test, refer to the following description.

Prepare a HDD and format it on DOS. Copy all files in the floppy disk in which the Sound test program is stored to the HDD. Reboot the computer from the HDD. The following message will appear:

```
#####
#####      WSS, Sound blaster pro Diagnostics program      #####
#####
*
*      1 .....      Sound (Standard)      *
*
*      2 .....      Sound (Legacy)      *
*
*      3 .....      CD Sound (Standard)      *
*
*      4 .....      CD Sound (Legacy)      *
*
*      ---It outputs at the speaker and lineout---      *
*
*****
.... Press test number[1-4] ?
```

Input the test number and press **Enter**.

3.29.1 Sound (Standard) test

To execute the Sound (Standard) test, press **1** and **Enter**. The following menu will appear in the display.

```
#####
#####      ICH4-M + AD1981A Diagnostics program      #####
#####
*
*      1 .....      ( Microphone recording & play )      *
*
*      2 .....      ( Sine wave )      *
*
*      3 .....      ( Line IN recording & play )      *
*
*      9 .....      Exit to Main      *
*
*****
.... Press test number[1-3, 9] ?
```

To return to the Sound test menu, press **9** and **Enter**. Then following message will appear in the display.

```
*****  
*****  May I Restart ?  *****  
*****  
Press any key to continue..
```

After pressing any key, the machine starts rebooting and sound test menu will appear in the display.

Subtest 01 Microphone recording & play

This subtest checks the function of the CODEC A/D, D/A converter.

When this subtest is selected, the following message will appear.

```
[Recording & play test !]
```

And the following message will appear.

```
DOS/4GW Protected Mode Run-time Version X.XX  
Copyright (c) Tenberry Software, Inc. XXXX
```

After this message appears, display stops briefly. In this timing, sound is recorded from internal microphone.

After the recording is completed, the computer plays back the sound recorded after the following message.

```
STACWAVE Version X.XX  
Build data: XXX XX XXXX at XX:XX:XX  
Loading "mic.wav".
```

NOTE: *The message in the display might have slight difference from those above.*

The display returns to the Sound (Standard) test menu after the test ends.

Subtest 02 Sine wave

This subtest is executed by loading the COM file (ADSIN.COM). The program expands sine wave data table from 16KB to 64KB, and creates the play data. Then it transfers the data between the DMA and the CODEC to play the sine wave. (It sounds like a continuous beep). By using wave measurable devices such as an oscilloscope, the data can be measured as a sine wave.

When the subtest is executed, the sine wave is played while expanding sine wave from 16KB to 64KB.

The display returns to the Sound (Standard) test menu after the test ends.

Subtest 03 Line IN recording & play

This subtest executes the same test as the subtest01 by recorded sound from the different port (Line-in port).

For more details on the subtest, refer to the subtest01 Microphone recording & play.

The display returns to the Sound (Standard) test menu after the test ends.

3.29.2 Sound (Legacy) test

To execute the Sound (Legacy) test, select **2** and press **Enter**.

<p>NOTE: <i>Sound (Legacy) test is not supported in this model.</i></p>
--

3.29.3 CD Sound (Standard) test

To execute the CD Sound (Standard) test, press **3** and **Enter**. Insert the test media (TOSHIBA TEST CD-ROM or ABEX TEST CD-ROM) or music CD on the market (if the test media can not be prepared). Following menu appears in the display.

For details on use of test media, refer to 3.29.3.1 Test media (Toshiba-made test media).
For details on use of audio CD on the market, refer to 3.29.3.2 Audio CD.

3.29.3.1 Test media (Toshiba-made test media)

```
CD/DVD TEST  IN PROGRESS XXXXXXXX
```

```
xxxxxxx DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break] : test end
[Ctrl]+[C]     : key stop
```

```
SUB-TEST      : XX
PASS COUNT    : XXXXX      ERROR COUNT: XXXXX
WRITE DATA   : XX         READ DATA  : XX
ADDRESS       : XXXXXXX    STATUS      : XXX
```

```
01 - Japanese Narration
02 - English Narration
03 - Test Tone A (100Hz - 20Hz)
04 - Test Tone B (400Hz - 3KHz L-R)
```

```
Drive # = 0, ATAPI status =00
Command = XX
[[Block address = XXXXXXXXX]]
[[Block length  = XXXXXXXXX]]
Final : Block address = XXXXXXXXX
```

Subtest 01 Japanese Narration

Selected this subtest, narration in Japanese starts and following message appears in the display.

```
Play start CD sound !
Press any key <Play stop>.
```

Press any key and stop the narration. Then return to the CD Sound (Standard) test menu.

Subtest 02 English Narration

Selected this subtest, narration in English starts.

For more details on the procedure, refer to the subtest01.

Subtest 03 Test Tone A

CAUTION: *Before starting subtest03, be sure to set the sound at proper volume.*

This subtest plays sine wave while changing its table from 100Hz to 20Hz.

The test returns to the CD Sound (Standard) menu after the test ends.

Subtest 04 Test Tone B

This subtest plays sine wave while changing its table from 400Hz to 3KHz and also changing the channel from left speaker to right speaker.

The test returns to the CD Sound (Standard) menu after the test ends.

CAUTION: *This model does not support the CD Sound (Standard) test.*

3.29.3.2 Audio CD

Insert an audio CD and the following menu appears in the display.

```

CD/DVD TEST  IN PROGRESS XXXXXXXX
xxxxxxx DIAGNOSTIC TEST VX.XX
[Ctrl]+[Break] ; test end
[Ctrl]+[C]      ; key stop

SUB-TEST      : XX
PASS COUNT   : XXXXX      ERROR COUNT: XXXXX
WRITE DATA  : XX         READ DATA  : XX
ADDRESS      : XXXXXXXX   STATUS       : XXX

```

```

CD Sound track number (01-98 : Track) ?

Drive # = 0, ATAPI status =00
Command = XX
[[Block address = XXXXXXXXX]]
[[Block length  = XXXXXXXXX]]

Final : Block address = XXXXXXXXX

```

Select the track number you want to test and press **Enter** twice.

The following message appears in the display and selected track is played.

```

Play start CD sound !
Press any key <play stop>

```

After pressing any key, the music stops and the display returns to the selection menu of the track number.

NOTE: When the CD-ROM test is executed, [ALL DEVICE] must be selected in the "Device Config.=" of the BIOS SETUP. If the "ALL DEVICE" is not selected, music can not be played.

3.29.4 CD Sound (Legacy) test

To execute the CD Sound (Legacy) test, select **4** and press **Enter**.

CAUTION: Sound (Legacy) test is not supported in this model.

3.30 SETUP

3.30.1 Function Description

This program displays the current system setup information as listed below:

1. Memory
 - (a) Total
2. System Date/Time
 - (a) Date (MM-DD-YYYY)
 - (b) Time (HH:MM:SS)
3. Battery
 - (a) Battery Save Mode
 - (b) PCI Express Link ASPM
 - (c) Enhanced C-States
4. Password
5. HDD Password
 - (a) HDD
 - (b) HDD Password Mode
 - (c) User Password
 - (d) Master Password
6. Boot Priority
 - (a) Boot Priority
 - (b) HDD Priority
 - (c) Network Boot Protocol
7. Others
 - (a) Core Multi-Processing
 - (b) Dynamic CPU Frequency Mode
 - (c) Execute-Disable Bit Capability
 - (d) Virtualization Technology
 - (e) Auto Power On
 - (f) Beep Volume
 - (g) Diagnostic Mode
 - (h) Language During Bootup

8. Configuration
 - (a) Device Config.
9. I/O ports
 - (a) Serial
 - (b) Parallel
10. Drives I/O
 - (c) Built-in HDD
 - (d) CD-ROM
11. PCI Bus
 - (a) PCI Bus
12. Security Controller
 - (a) TPM
 - (b) Clear TPM Owner
13. Display
 - (a) Power On Display
 - (b) LCD Display Stretch
 - (c) TV Type
14. Peripheral
 - (a) Internal Pointing Device
 - (b) EXT Keyboard "Fn"
 - (c) Parallel Port Mode
15. Legacy Emulation
 - (a) USB KB/Mouse Legacy Emulation
 - (b) USB-FDD Legacy Emulation
 - (c) USB Memory BIOS Support Type
16. PCI LAN
 - (a) Built-in LAN

3.30.2 Accessing the SETUP Program

Turn on the power while pressing **ESC**, the following menu appears.

Check system. Then press [F1] key.

Then press **F1**. The following display appears.

```

                                SYSTEM SETUP (1/2)                                ACPI BIOS version = X.XX
----- MEMORY -----
Total                               = XXXXX MB

----- SYSTEM DATE/TIME -----
Date (MM-DD-YY)                     = XX-XX-XXXX
Time (HH:MM:SS)                     = XX:XX:XX

----- BATTERY -----
Battery Save Mode                    = Full Power
PCI Express Link ASPM                = Enabled
Enhanced C-States                   = Enabled *1

----- PASSWORD -----
Not Registered

----- HDD PASSWORD*2 -----
HDD                                  = Built-in HDD
HDD Password Mode                   = Master+User
User Password                       = Not Registered
Mastere Password                    = Not registered

----- BOOT PRIORITY -----
Boot Priority = HDD → FDD → CD-ROM → LAN
HDD Priority = Built in HDD → USB
Network Boot Protocol = PXE *2

----- OTHERS -----
Core Multi-Processing = Enabled *1
Dynamic CPU Frequency Mode *1
                                = Dynamically Switchable
Execute-Disable Bit Capability
                                = Not Available
Virtualization Technology = Disabled*6
Auto Power On                   = Disabled
Beep Volume                      = Medium
Diagnostic Mode                  = Disabled
Language During Bootup = English *5

```

↑↓←→: Select items **Space, BkSp**: Change values **PgDn, PgUp**: Change pages
Esc: Exit without saving **Home**: Set default values **End**: Save changes and Exit

```

                                SYSTEM SETUP (2/2)                                ACPI BIOS version = X.XX

----- CONFIGURATION -----
Device Config.                      = Setup by OS

----- I/O ports -----
Serial                               = COM1 (3F8H/IRQ4)
Parallel                             = LPT1 (378H/IRQ7/CH3)

----- DRIVES I/O -----
Built-in HDD = Seial ATA Port0
CD-ROM = Secondary IDE (170H/IRQ15) *3

----- PCI BUS *4 -----
PCI BUS                             = IRQ10, IRQ11

----- SECURITY CONTROLLER -----
TPM                                  = Disable
Clear TPM Owner

----- DISPLAY -----
Power On Display                    = Auto-Selected
LCD Display Stretch                 = Enabled
TV Type                             = NTSC (US)

----- PERIPHERAL -----
Internal Pointing Device = Enabled
EXT Keyboard "Fn"              = Disabled
Parallel Port Mode            = ECP

----- LEGACY EMULATION -----
USB KB/Mouse Legacy Emulation
                                = Enabled
USB-FDD Legacy Emulation        = Enabled
USB Memory BIOS Support Type = HDD

----- PCI LAN -----
Built-in LAN                      = Enabled

```

↑↓←→: Select items **Space, BkSp**: Change values **PgDn, PgUp**: Change pages
Esc: Exit without saving **Home**: Set default values **End**: Save changes and Exit

NOTE: *1: displayed only in Intel Core CPU model.
*2: displayed only in ATI chipset models.
*3: displayed in model with CD-ROM installed.
*4: not displayed in ATI chip set model
*5: displayed only in TCL models.
*6: displayed only in ATI chipset models..

Moving Within the SETUP Menu and Changing Values

1. Press ← and → to move between the two columns. Press ↑ and ↓ to move between items in a column. Press **Fn+↑ (PgUp)** and **Fn + ↓ (PgDn)** to move between the two pages.
2. Press either the **Space bar** or **Back Space** to change the value.

Accepting Changes and Exiting the SETUP Window

1. Press **End** to accept the changes you made.

If the changed item does not require the system to reboot, the following message is displayed:

Are you sure? (Y/N)

If the changed item requires the system to reboot, the following message is displayed:

Are you sure? (Y/N)

The changes you made will cause the system to reboot.

2. To make other changes, press **N**. Repeat the steps above.
3. To accept the changes, press **Y**.

NOTE: You can press **Esc** to quit at any time without saving changes. **SETUP** asks you to confirm that you do not want to save your changes. When **SETUP** is displayed at the next time, the current configuration appears.

The Factory Preset Configuration

When you access SETUP, the current configuration is displayed.

1. To show the factory preset configuration, press **Home**.
2. Press **End** and then press **Y** to accept the factory preset settings.

NOTE: *When you execute the default setting, the following settings are not changed:*
Password
Execute-Disable Bit function

SETUP Options

The SETUP screen is divided into functionally related groups. This section describes each group and its options.

1. Memory

This group of options displays the computer's memory.

(a) Total

This field displays the total amount of memory installed and is automatically calculated by the computer. You cannot change this value.

2. System Date/Time

Use this option to set the computer's system date/time.

(a) Date

Use this option to set the system date of the computer.

(b) Time

Use this option to set the system time of the computer.

3. Battery

This option is used to select Full Power, Low Power or User Setting of the battery save mode.

Full Power The following shows full power settings.

Full Power	
Processing Speed	= High
CPU Sleep Mode	= Enabled
LCD Brightness	= Super-Bright
Cooling Method	= Maximum Performance

Low Power The following shows low power settings.

Low Power	
Processing Speed	= Low
CPU Sleep Mode	= Enabled
LCD Brightness	= Bright
Cooling Method	= Battery Optimized

NOTE: *The brightness is when a AC adaptor is connected. When powered by a battery it is displayed as follows.*

Battery Save Mode = Full power : LCD Bright ness = Bright.

Battery Save Mode = Low power: LCD Bright ness = Semi-Bright.

(a) **Battery Save Mode**

When “User Setting” is selected, the sub-window, BATTERY SAVE OPTION is displayed. The following set of options can be selected in the submenu.

Processing Speed

This feature changes the CPU processing speed.

High CPU operates at high speed. (Default)

Low CPU operates at low speed.

CPU Sleep Mode

Use this option to enable or disable the CPU sleep function.

Enabled Enables sleep mode. (Default)

Disabled Disables sleep mode.

LCD Brightness

Use this option to set the level of LCD brightness.

Super-Bright Full brightness for maximum visibility.

Bright Full brightness for high visibility. (Default)

Semi-Bright Less than full brightness for saving power.

Cooling Method

If the CPU becomes too hot, the fan turns on or the processing speed is lowered automatically. When the CPU temperature falls to a normal range, the fan turns off.

Maximum performance	If the CPU becomes too hot, the fan turns on automatically at a high speed to cool down the CPU.(Default)
Performance	If the CPU becomes too hot, the fan turns on automatically. When the CPU temperature falls to a normal range, the fan turns off.
Battery optimized	If the CPU becomes too hot, the processing speed is lowered. If the temperature is still too high, the fan turns on. When the CPU temperature falls to a normal range, the fan is turned off and the processing speed is increased.
Cooling optimized	If the CPU becomes too hot, the fan turns on automatically in a high speed to cool down the CPU. Gives priority to the decrease of temperature at the bottom of the PC.

(b) PCI Express Link ASPM

Enabled	Saves power consumption, when the PCI Express device is not used. (Default)
Auto	Saves power consumption, when the PCI Express device is not used while the battery is working.
Disabled	Disables the power saving function and gives priority to the performance.

(c) Enhanced C-States

This feature enables or disables the Enhanced C-States.

Enabled	This lowers the power consumption.
Disabled	This does not lower the power consumption.

4. Password

This option allows you to set or reset the user password for power on.

Registered	A password has been registered.
Not Registered	Change or remove the password. (Default)

For details on setting the user password, refer to the User's Manual.

5. HDD Password

This option sets HDD password. HDD password is a security function to protect the built-in HDD.

(a) HDD

This item selects the hard disk to set HDD password.

Built-in HDD Sets HDD password for the built-in HDD

(b) HDD Password Mode

This item registers HDD password and can be selected only for registering HDD password. To change HDD Password Mode when HDD password is registered, delete the registered HDD password first, and then register new password.

User Only Sets only User HDD Password (Default)

Master+User Sets Master HDD Password and User HDD Password

(c) User Password

This item sets User password.

For details on setting user password, refer to the User's Manual.

(d) Master Password

This item sets the Master HDD password.

This can be set **Master+User** is set in the HDD password Mode. For details, refer to the User's Manual.

6. Boot Priority

This tab sets the priority for booting the computer and the priority for the built-in HDD or optional secondary HDD.

(a) Boot Priority

HDD→FDD→CD-ROM→LAN: The computer looks for bootable files in the following order: HDD, FDD, CD-ROM and LAN. (Default)

FDD→HDD→CD-ROM→LAN: The computer looks for bootable files in the following order: FDD, HDD, CD-ROM and LAN.

HDD→CD-ROM→LAN→FDD: The computer looks for bootable files in the following order: HDD, CD-ROM, LAN and FDD.

- FDD→CD-ROM→LAN→HDD:** The computer looks for bootable files in the following order: FDD, CD-ROM, LAN and HDD.
- CD-ROM→LAN→HDD→FDD:** The computer looks for bootable files in the following order: CD-ROM, LAN, HDD and FDD.
- CD-ROM→LAN→FDD→HDD:** The computer looks for bootable files in the following order: CD-ROM, LAN, FDD and HDD.

NOTE: *CD-ROM refers to a DVD-ROM&CD-R/RW drive or DVD Super Multi drive.*

(b) HDD Priority

This option enables to select the priority for the Built-in HDD or USB.

Built-in HDD → USB (Default)

USB → Built-in HDD

(c) Network Boot Protocol

Use this option to set the starting method via a network.

PXE Sets to PXE protocol. (Default)

RPL Sets to RPL protocol.

7. Others

Whether or not you need to configure the computer with these options depends primarily on the kind of software or peripherals you use.

(a) Core-Multi Processing

The Core Multi-Processing sets the CPU operating mode of Core Multi-Processor.

Enabled Enables Core Multi-Processing functions. (Default)

Disabled Disables Core Multi-Processing functions.

(b) Dynamic CPU Frequency Mode

Use this option to choose a setting from the followings.

Dynamically Switchable

Enables Intel SpeedStep technology. When the computer is in use, the CPU power consumption and clock speed are automatically switched when necessary. (Default)

- Always High** Disables Intel SpeedStep technology and always runs the processor at its fastest speed.
- Always Low** Disables Intel SpeedStep technology and always runs the processor at low power consumption and low speed.

(c) Execute-Disable Bit Capability

Selects the function to reports whether the CPU Execute-Disable Bit is available or not to OS. When the CMOS is damaged, the default is **Available**. When **Home** is pressed, the setting is not changed and the setting is kept.

- Available** Reports that the function is available.
- Not Available** Reports that the function is not available. (Default)

(d) Virtualization Technology

Virtualization Technology sets enable or disable of the Intel Virtualization Technology installed in the CPU.

Intel Virtualization Technology is the technique that allows one machine to operate as multiple virtual machines.

- Enabled** Enables Virtualization Technology.
- Disabled** Disables Virtualization Technology. (Default)

(e) Auto Power On

Use this option to set a time and date for automatic power on and enable or disable the ring indicator feature. **Alarm Date Option** appears only when **Alarm Time** is enabled.

OPTIONS	
Alarm Time	= 00:00:00
Alarm Date Option	= Disabled
Wake-up on LAN	= Disabled*

*Only for LAN Model

Alarm Time is set in the sequence of hours and minutes. Seconds cannot be changed. **Alarm Date Option** is set in the sequence of month and day. If Alarm Date is set to Disabled, the computer will be powered on at the same time every day. Press ↓ to move the cursor to the right and ↑ to move the cursor to the left when you set the date and time.

- NOTE:** 1. Do not remove the AC adapter and battery pack at the same time when you use this feature. If you do so, data saved by the resume function will be lost. You must also reset this option.
2. When a password is set in Password Security, the system is in standby mode, the Timer on function (Auto Power PN) is set and the system is booted, "Password =" is displayed. When the password set in Password Security is input, the computer returns to Windows from standby mode.
3. This function is effective only once, it is released after booting up.

(f) Beep Volume

This option selects the volume of beep (Warning). "OFF", "Low", "Medium" (Default) or "High" can be selected. If a memory module that does not comply with the standards, the computer beeps at maximum volume.

(g) Diagnostic Mode

This option sets whether the BIOS Setup Diagnostic test is enabled.

Disabled The Diagnostic test is disabled. (Default)

Enabled The Diagnostic test is enabled.

(h) Language During Bootup

This option selects the language during bootup. This message appears only on the model for TCL (Canada).

English The message is displayed in English. (Default)

French The message is displayed in French.

8. Configuration

This option displays the configuration method.

(a) Device Config.

The devices are initialized when the PNP OS loads.

Setup by OS Initializes devices, which is needed to load an operating system. Operating system initializes other devices. (Default)

All Devices All devices will be initialized.

If you are using an OS that does not have PNP capacity, select "All Devices." The Display shows the following message:

Device Config. = All Devices

9. I/O ports

This option controls settings for the serial and parallel ports.

NOTE: Do not assign the same interrupt request level and I/O address to the serial port and PC card.

(a) Serial

Use this option to set the COM level for the serial port.

Not used	Does not assign the serial port.
COM1	Assign the serial ports (Default)
COM2 to COM4	Assign the serial ports

(b) Parallel

This option sets the interrupt request level and I/O port base address for the parallel port.

When the parallel port mode (see settings below) is set to **ECP** and “**Not used**” is selected in **Parallel, OPTION** window is opened and DMA can be set.

10. Drives I/O

This option displays the address/interrupt level for hard disk drive and optical drive. It is only for information and cannot be changed.

(a) Built-in HDD

This option displays the setting of the address and interrupt level of the HDD. This cannot be changed.

(b) CD-ROM

This option displays the setting of the address and interrupt level of the installed drive. This cannot be changed. Even if an installed drive is not CD-ROM drive, “CD-ROM” is displayed.

11. PCI Bus

This item displays the interrupt level for the Card Bus. It is for information only and cannot be changed.

PCI BUS = IRQ10, IRQ11

12. Security controller

(a) TPM

Disables the security controller called TPM (Trusted Platform Module). When the cursor is on the **Enable (Disable)** and the **Space** is pressed, message is displayed and the PC waits **Y** or **N** key input by the user. When **Y** is pressed, it is sets to **Enable (Disable)**. After changing, the cursor could not be moved on the **TPM** tem. This option can be changed after rebooting.

Disabled Disables the TPM. (Default)

Enabled Enables the TPM.

(b) Clear TPM Owner

This is not displayed when the **TPM** is set to **Disabled**. This is executed, when the PC is disposed or the owner of the PC changes. When the cursor is on this item and the **Space** is pressed, message is displayed and the PC waits **Y, E, S** and **Enter** key inputs by the user. When **Y, E, S** and **Enter** keys are pressed, the data is disposed. After changing, the display of **TPM** item is changed to **Disabled** and this item becomes not displayed and the cursor could not be moved on the **TPM** item.

13. Display

This group of options configures the computer's display.

(a) Power On Display

This option is used to select the display when booting up.

Auto-Selected Selects an external monitor if one is connected. Otherwise it selects the internal LCD. (Default)

LCD+AnalogRGB Selects both the internal LCD and the external monitor for simultaneous display.

NOTE: Pressing **Fn+F5** changes the display setting in the order of internal LCD to simultaneous to external monitor.

(b) LCD Display Stretch

LCD Display Stretch enables or disables a larger display area of the screen.

Enabled Enables the LCD display stretch feature. (Default)

Disabled Disables the LCD display stretch feature.

(c) TV type

This option allows you to select the type of TV.

NTSC (Japan)	TV in Japanese system (Default)
NTSC (US)	TV in the U.S. system
PAL (S-Video)	TV in Europe system
525p (480p,D2)	High Definition Television with 480 progressive scan
750p (720p,D4)	High Definition Television with 720 progressive scan
1125i (1080i,D3)	High Definition Television with 1080 interlace
525i (480i,D1)	High Definition Television with 480 interlace
PAL (SCART)	TV in Europe system with SCART

525p (480p,D2)、750p (720p,D4)、1125i(1080i,D3)、525i (480i,D1)、PAL (SCART) can be displayed in G73 models with “D terminal”.

14. Peripheral

Use this option to select the parallel port mode and hard disk mode.

(a) Internal Pointing Device

This option enables and disables the Touch Pad.

Enabled Enables the Touch Pad. (Default)

Disabled Disables the Touch Pad.

(b) Ext Keyboard “Fn”

This option enables or disables Fn key function on the external keyboard.

Enabled Enables the feature.

Disabled Disables the feature. (Default)

When “Enabled” is selected, the sub-window appears.

Use this option to set a key combination on an external keyboard to emulate the **Fn** key on the computer's internal keyboard. Setting a **Fn** key equivalent will enable you to use “Hotkeys” by pressing the set combination in place of the **Fn** key. The following items can be selected for this option:

= **Left Ctrl + Left Alt (*1)**

= **Right Ctrl + Right Alt (*2)**

= **Left Alt + Left Shift**

= **Right Alt + Right Shift**

= **Left Alt + Caps Lock**

NOTE: If these selections ((*1) or (*2)) are made, you cannot warm boot the system by pressing **Ctrl + Alt + Del**.

(c) Parallel Port Mode

Use this option to set information of Parallel Port Mode.

- ECP** Sets the port mode to Extended Capabilities Port (ECP).
For most printers, the port should be set to ECP. (Default)
- Std. Bi-Direct.** Sets the bi-directional setting. This setting should be used with some other parallel devices.

NOTE: When using Windows, the setting of “Toshiba HW setup” is enabled and the setting of “Parallel Port Mode” is disabled.

15. Legacy Emulation.

(a) USB KB/Mouse Legacy Emulation.

Use this option to enable or disable USB KB/Mouse Legacy Emulation. If your operating system does not support USB, you can still use a USB mouse and keyboard by setting the **USB KB/Mouse Legacy Emulation** item to **Enabled**.

- Enabled** USB Legacy Support can be used. (Default)
- Disabled** USB Legacy Support cannot be used.

(b) USB-FDD Legacy Emulation.

Use this option to enable or disable USB-FDD Legacy Emulation.

- Enabled** USB Legacy Support can be used. (Default)
- Disabled** USB Legacy Support cannot be used.

(c) USB Memory BIOS Support Type

Sets the type of the USB memory as a startup device.

- HDD** Set the type of the USB memory to be equivalent to the HDD (Default).
Based on the [HDD] order in the [Boot Priority Options] item. The order with respect to the other HDD can be set in the [HDD Priority Options] item.
- FDD** Set the type of the USB memory to be equivalent to the FDD.
Based on the [FDD] order in the [Boot Priority Options] item.

16. PCI LAN

This option enables/disables the Built-in LAN functions.

(a) Built-in LAN

Enabled Enables Built-in LAN functions. (Default)

Disabled Disables Built-in LAN functions.

Chapter 4

Replacement Procedures

Chapter 4 Contents

4.1	General.....	4-1
4.2	Battery pack	4-8
4.3	PC card.....	4-10
4.4	SD card.....	4-11
4.5	HDD.....	4-12
4.6	MDC/Memory module.....	4-16
4.7	Keyboard.....	4-19
4.8	Optical drive	4-22
4.9	Wireless LAN card	4-25
4.10	Cover assembly.....	4-27
4.11	SW membrane.....	4-31
4.12	Fingerprint sensor board	4-33
4.13	Touch pad.....	4-35
4.14	SD card slot.....	4-38
4.15	Bluetooth module.....	4-39
4.16	Serial/S-Video board.....	4-41
4.17	RTC battery	4-42
4.18	Modem jack	4-44
4.19	Fan.....	4-45
4.20	System board.....	4-47
4.21	Battery lock.....	4-49
4.22	HDD cable	4-51
4.23	Heat sink/CPU	4-52
4.24	PC card slot.....	4-56
4.25	LCD unit/FL inverter	4-57
4.26	Cover latch.....	4-62
4.27	Display rear cover.....	4-63
4.28	Wireless LAN antenna/Bluetooth antenna	4-65
4.29	Hinge.....	4-71
4.30	Speaker.....	4-73

4.31	Fluorescent Lamp.....	4-77
4.31.1	Replacing the 15.4-inch WXGA LG Philips Fluorescent Lamp.....	4-78
4.31.2	Replacing the 15.4-inch WXGA Samsung Fluorescent Lamp.....	4-87

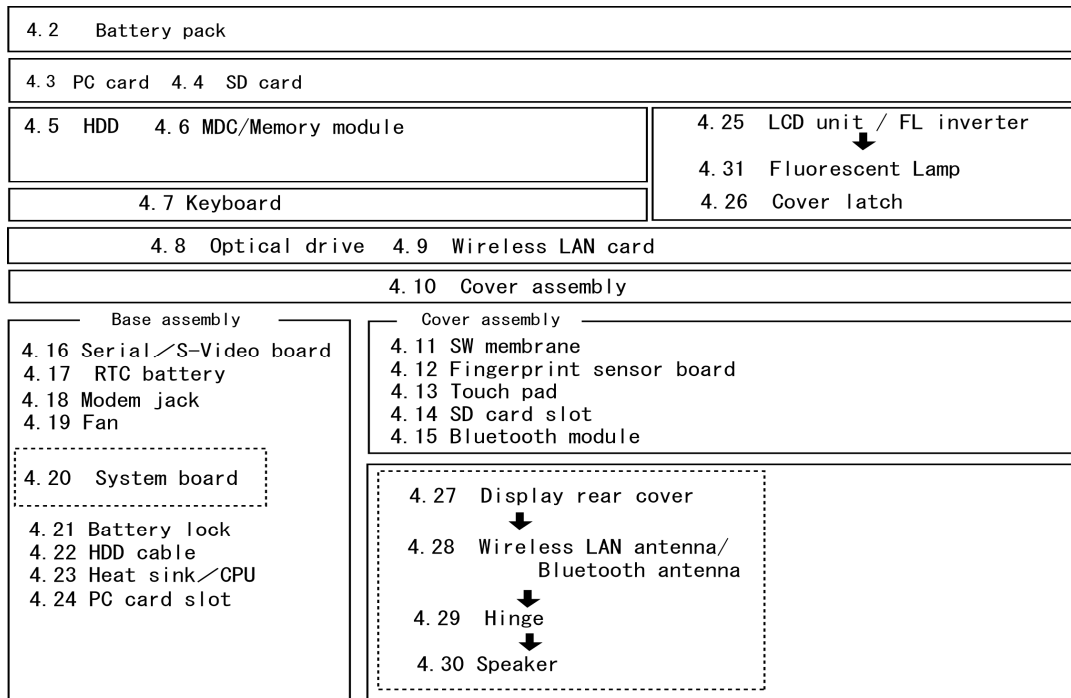
Figures

Figure 4-1	Removing the battery pack	4-8
Figure 4-2	Removing the battery	4-9
Figure 4-3	Removing the PC card	4-10
Figure 4-4	Removing the SD card	4-11
Figure 4-5	Removing the HDD cover	4-12
Figure 4-6	Removing the HDD assembly	4-13
Figure 4-7	Separating the HDD and HDD holder	4-14
Figure 4-8	Removing the MDC.....	4-16
Figure 4-9	Removing the memory module.....	4-17
Figure 4-10	Removing the keyboard (1)	4-19
Figure 4-11	Removing the keyboard (2)	4-20
Figure 4-12	Removing the optical drive.....	4-22
Figure 4-13	Disassembling the optical drive.....	4-23
Figure 4-14	Removing the wireless LAN card.....	4-25
Figure 4-15	Removing the cover assembly (1).....	4-27
Figure 4-16	Removing the cover assembly (2).....	4-28
Figure 4-17	Removing the cover assembly (3).....	4-29
Figure 4-18	Removing the switch cover.....	4-31
Figure 4-19	Removing the SW membrane	4-32
Figure 4-20	Removing the fingerprint sensor board	4-33
Figure 4-21	Removing the touch pad (1).....	4-35
Figure 4-22	Removing the touch pad (2).....	4-36
Figure 4-23	Removing the SD card slot	4-38
Figure 4-24	Removing the Bluetooth module	4-39
Figure 4-25	Removing the serial/s-video board	4-41
Figure 4-26	Removing the RTC battery	4-43

Figure 4-27	Removing the modem jack	4-44
Figure 4-28	Removing the fan	4-45
Figure 4-29	Removing the system board.....	4-47
Figure 4-30	Removing the battery lock.....	4-49
Figure 4-31	Removing the HDD cable.....	4-51
Figure 4-32	Removing the heat sink.....	4-52
Figure 4-33	Removing the CPU	4-53
Figure 4-34	Installing the CPU.....	4-54
Figure 4-35	Applying new grease	4-55
Figure 4-36	Removing the PC card slot	4-56
Figure 4-37	Removing the LCD mask.....	4-57
Figure 4-38	Removing the FL inverter.....	4-58
Figure 4-39	Removing the LCD unit.....	4-59
Figure 4-40	Removing the LCD cable.....	4-60
Figure 4-41	Removing the cover latch	4-62
Figure 4-42	Removing the display rear cover	4-63
Figure 4-43	Removing the wireless LAN antenna/Bluetooth antenna.....	4-65
Figure 4-44	Removing the hinge	4-71
Figure 4-45	Removing the speaker (1).....	4-73
Figure 4-46	Removing the speaker (2).....	4-74
Figure 4-47 to 4-54	Replacing LG.Philips fluorescent lamp (1) to (8)	4-79 to 4-86
Figure 4-55 to 4-58	Replacing Samsung fluorescent lamp (1) to (4)	4-87 to 4-89

4.1 General

This section explains how to disassemble the computer and replace Field Replaceable Units (FRUs). It may not be necessary to remove all the FRUs in order to replace one. The chart below is a guide to which FRUs need to be removed in order to remove others. Always start by removing the battery pack, next, optional items such as the optional PC card and optional SD card, then follow the line on the chart to determine which FRU you must remove next in order to repair the one you think is causing the computer to operate improperly. Refer to the example at the bottom of the page.

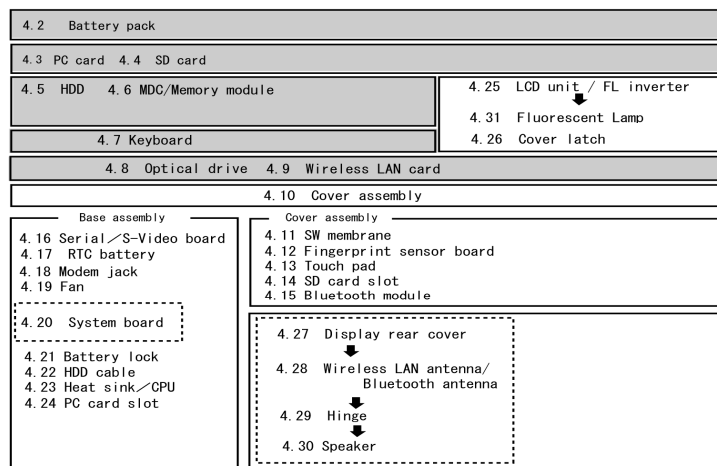


How to see the chart:

This chart shows which unit(s) you need to remove in advance when you replace one unit.

Example:

When you want to replace the Cover assembly, you need to remove units, in the hatched boxes above the boxes in which the touch pad is.



Safety Precautions

Before you begin disassembly, read the following safety precautions and observe them carefully as you work.

- DANGER:**
- 1) *Always use the genuine battery that is authorized by Toshiba or compatible with the unit. Since other battery packs have different specifications, they may be incompatible with the unit, and may burst or explode.
Never heat or disassemble the battery pack, as that could cause leakage of alkaline solution. Never throw the battery pack into a fire, as that could cause the battery pack to explode.*
 - 2) *The power supply, FL inverter and other components carry high voltages. If you need to turn on the power of a partially disassembled computer to check its operation, be very careful not to touch connectors or components, in order to avoid the risk of electric shock. Also, do not disassemble individual components in first-level maintenance.*

- WARNING:**
- 1) *Turn off the power and disconnect the AC adaptor from the power source, to avoid exposure to electric shock.*
 - 2) *Batteries in the computer retain an electrical charge, so there is danger of electrical shock even when the computer is disconnected from an AC power source. Remove any metal jewelry or accessories such as necklaces, bracelets or rings, in order to reduce the risk of electric shock. Never work with wet or damp hands.*
 - 3) *Be careful of edges and corners as these may cut.*

- CAUTION:**
- 1) *When you change a component, be sure the replacement component meets the required specifications. Never use foreign parts, to avoid any risk of damage to the computer.*
 - 2) *To avoid any risk of short-circuit, fire or other internal damage, never allow any metal objects such as screws or paper clips to fall into the unit. Be sure to replace screws with the same size as those removed. Make sure all screws are securely fastened. Loose screws can cause short circuits, resulting in heat, smoke or fire.*
 - 3) *Before lifting out an FRU or other component, make sure all cables to the component have been disconnected, in order to reduce the risk of accidental electric shock.*
 - 4) *If you use AC power, be sure to use the cable that came with the computer or one recommended by Toshiba.*
 - 5) *Make sure that all replacement components meet the specifications for the computer and that all cables and connectors are securely fastened, in order to avoid the risk of electric shock.*
 - 6) *Some parts inside the computer, such as the CPU and cooling module, become very hot during operation. Conduct repair work after they have cooled. Be careful around the CPU and cooling module to avoid burns.*

Before You Begin

Look over the procedures in this section before you begin disassembling the computer. Familiarize yourself with the disassembly and reassembly steps. Begin each procedure by removing the AC adapter and the battery pack as instructed in this section:

1. Do not disassemble the computer unless it is operating abnormally.
2. Use only the correct and approved tools.
3. Make sure the working environment is free from the following elements whether you are using or storing the computer.
 - Dust and contaminants
 - Static electricity
 - Extreme heat, cold and humidity
4. Make sure the FRU you are replacing is causing the abnormal operation by performing the necessary diagnostics tests described in this manual.
5. Do not perform any operations that are not necessary and use only the described procedures for disassembling and installing FRUs in the computer.
6. After removing parts from the computer, place them in a safe place away from the computer so they will not be damaged and will not interfere with your work.
7. You will remove and replace many screws when you disassemble the computer. When you remove screws, make sure they are placed in a safe place and identified with the correct parts.
8. When assembling the computer make sure you use the correct screws to secure the various pieces in place. Screw sizes are listed in their corresponding figures.
9. The computer contains many sharp edges and corners, so be careful not to injure yourself.
10. After you have replaced an FRU, make sure the computer is functioning properly by performing the appropriate test on the FRU you have fixed or replaced.

Disassembly Procedures

The computer has two basic types of cable connectors:

- Pressure Plate Connectors
- Coaxial Cable Connectors
- Normal Pin Connectors

To disconnect a Pressure Plate connector, lift up the tabs on either side of the connector's plastic pressure plate and slide the cable out of the connector. To connect the cable to a Pressure Plate connector, make sure the pressure plate is fully lifted and slide the cable into the connector. Secure the cable in place by pushing the sides of the pressure plate down so the plate is flush with the sides of the connector. Gently pull on the cable to make sure the cable is secure. If you pull out the connector, connect it again making sure the connector's pressure plate is fully lifted when you insert the cable.

Coaxial cables should be disconnected with an antenna coaxial disconnecter.

Normal Pin connectors are used with all other cables. These connectors can be connected and disconnected by simply pulling them apart or pushing them together.

Assembly Procedures

After you have disassembled the computer and fixed or repaired the problem that was causing the computer to operate abnormally, you will need to reassemble the computer.

Install all the removed FRUs following the steps described in the corresponding sections in this chapter.

While assembling the computer, remember the following general points:

- Take your time, making sure you follow the instructions closely. Most problems arise when you get in a hurry assembling the computer.
- Make sure all cables and connectors are securely fastened.
- Before securing the FRU or other parts, make sure that screws or the FRU will pinch no cables.
- Check that all latches are closed securely in place.
- Make sure all the correct screws are used to secure all FRUs. Using the wrong screw can either damage the threads on the screw or the head of the screw and may prevent proper seating of an FRU.

After installing an FRU in the computer, confirm that the FRU and the computer are functioning properly.

Tools and Equipment

The use of Electrostatic Discharge (ESD) equipment is very important for your safety and the safety of those around you. Proper use of these devices will increase the success rate of your repairs and lower the cost for damaged or destroyed parts. The following equipment is necessary to disassemble and reassemble the computer:

- One M2 point size 0 Phillips screwdriver
- One M2.5/M3 point size 1 Phillips screwdriver
- One screw driver for stud screw
- One 4 mm flat-blade screwdriver
- Tweezers, to lift out screws that you cannot grasp with your fingers
- ESD mats for the floor and the table you are working on
- An ESD wrist strap or heel grounder
- Anti-static carpeting or flooring
- Air ionizers in highly static sensitive areas
- Plastic card of the size of credit card
- Antenna coaxial cable disconnecter

Screw Tightening Torque

When you fasten screws, be sure to follow the torque list below.

CAUTION: *Overtightening can damage components and screws; undertightening can result in electrical shorts or other damage if screws or components come loose.*

NOTE: *Toshiba recommends that you use an electric screw driver for quick and easy operations.*

- M2 0.167 N·m (1.7 kgf·cm)
- M2.5 0.294 N·m (3.0 kgf·cm)
- M3 0.549 N·m (5.6 kgf·cm)

NOTE: *The computer contains several flat head screws. These screws have less contact area with the screwdriver, so be careful to press firmly enough to prevent the screwdriver from slipping out and damaging the screw head.*

Color of Screw Shaft

To avoid mistakes on the screw length, screw shafts are colored as follows:

- Even number length screw: yellow
- Odd number length screw: pink
- Special length screw: green

Screws whose lengths are indicated to one or more decimal places such as 2.5 mm or 2.6 mm.

Marking of Screws on the Computer Body

To make maintenance of the computer easier, markings of the kinds of the screws including the types and lengths of the screws are indicated on the computer body.

Kind of screws	Symbol
<input type="checkbox"/> BIND screw	B
<input type="checkbox"/> FLAT HEAD screw	F
<input type="checkbox"/> SUPER THIN HEAD screw	S
<input type="checkbox"/> TAPPING screw	T
<input type="checkbox"/> Other screws (Unique screws, STUD, etc.)	U

Examples:

- 6 mm BIND screw B6
- 12 mm BIND screw B12
- 4 mm FLAT HEAD screw F4
(Indicates the screwed length in round number regardless the length of the stud.)

4.2 Battery pack

Removing the Battery pack

To remove the battery pack, follow the steps below and refer to Figure 4-1 and 4-2.

CAUTION: When handling battery packs, be careful not to short circuit the terminals. Also do not drop, hit or apply impact, do not scratch, break, twist or bend the battery pack.

1. Turn off the power of the computer.
2. Disconnect the AC adapter and other external devices from the computer.
3. Turn the computer face down.
4. Release the **battery lock**. Insert your finger tip in to the slit and take out the **battery pack** while sliding the **battery latch** as shown in the following figure.

NOTE: For environmental reasons, do not throw away a spent battery pack.

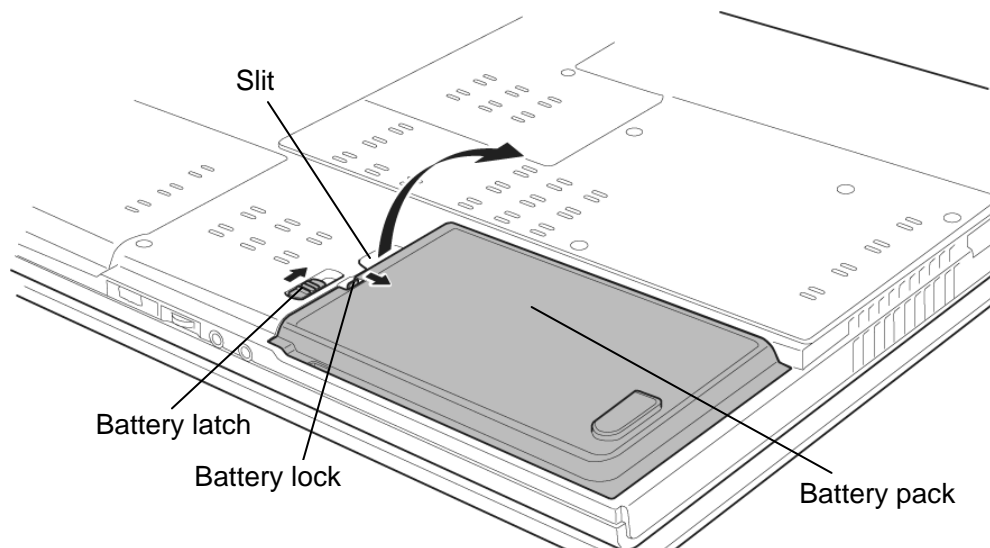


Figure 4-1 Removing the battery pack

5. Separate the **battery** and **battery cover** while releasing **hooks**.

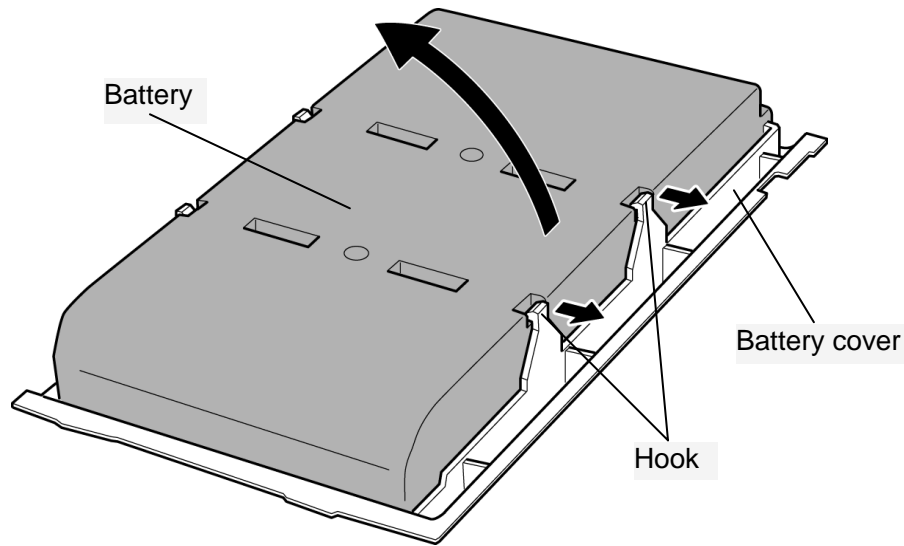


Figure 4-2 Removing the battery

Installing the Battery pack

To install the battery pack, follow the steps below and refer to Figure 4-1 and 4-2.

CAUTION: The battery pack is a lithium ion battery, which can explode if not properly replaced, used, handled or disposed of. For environmental reasons, collect the spent battery packs. Use only batteries recommended by Toshiba for replacements.

NOTE: Check the battery's terminals visually. If they are dirty, wipe them clean with a dry cloth.

1. Turn off the power of the computer.
2. Disconnect the AC adapter and all other external devices to the computer.
3. Install the **battery** to the **battery cover** while engaging the **hooks**.
4. Insert the **battery pack** into the battery slot. Make sure the battery pack is installed securely.
5. Slide the **battery lock** into the lock position.

4.3 PC card

Removing the PC card

To remove the PC card, follow the steps below and refer to Figure 4-3.

CAUTION: Before you remove the PC card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Press the **eject button** for the PC card to extend the button.
2. Press the extended eject button to pop the PC card out.
3. Grasp the **PC card** and pull it out.

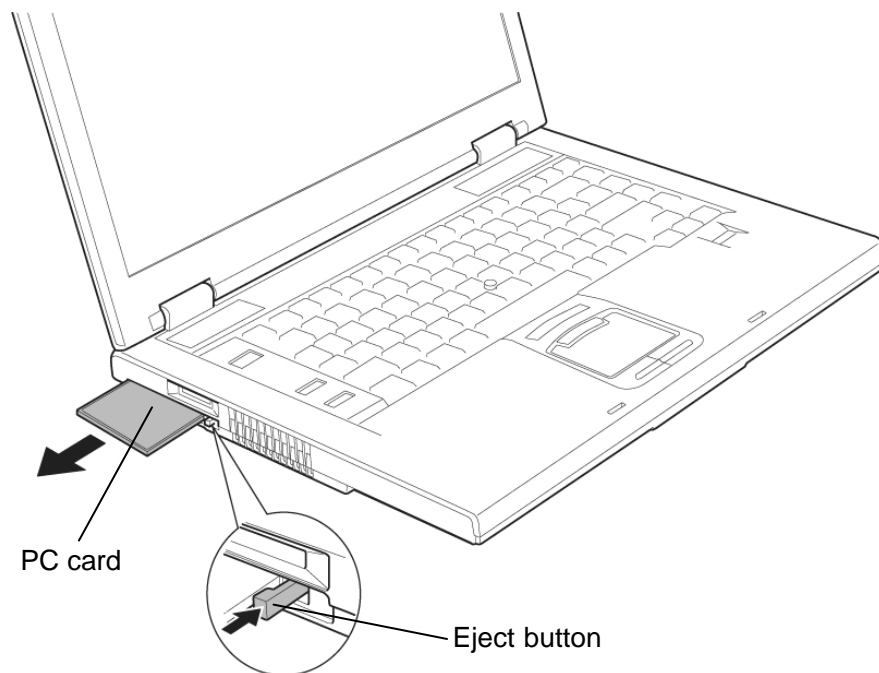


Figure 4-3 Removing the PC card

Installing the PC card

To install the PC card, follow the steps below and refer to Figure 4-3.

1. Insert the **PC card** into the card slot.
2. Push it carefully to ensure a firm connection.

4.4 SD card

Removing the SD card

To remove the SD card, follow the steps below and refer to Figure 4-4.

CAUTION: Before you remove the SD card, refer to the card's documentation and to your operating system documentation for proper procedures and precautions.

1. Push the **SD card** in and release it to pop the card out.
2. Grasp the **SD card** and pull it out.

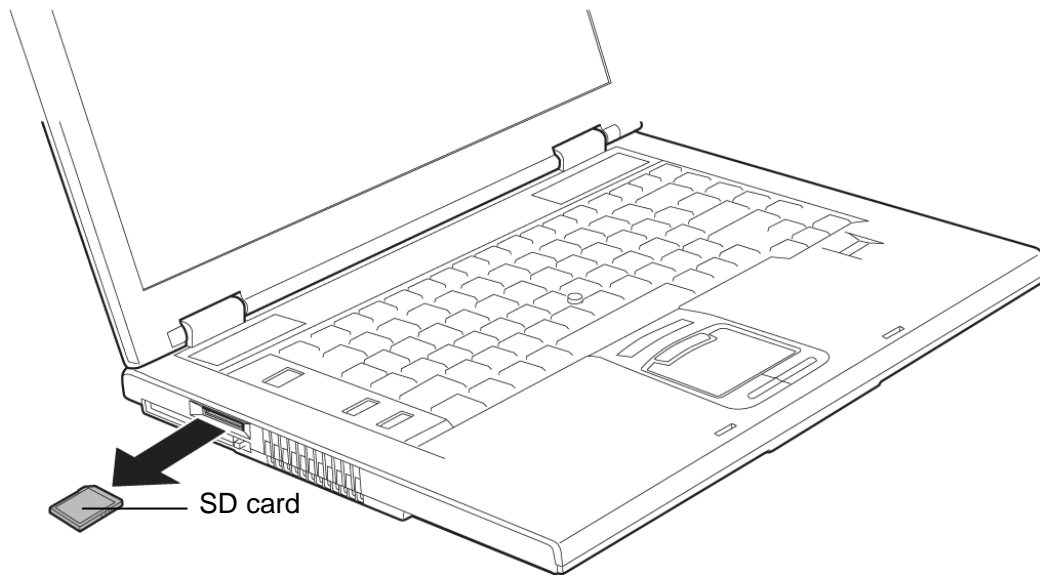


Figure 4-4 Removing the SD card

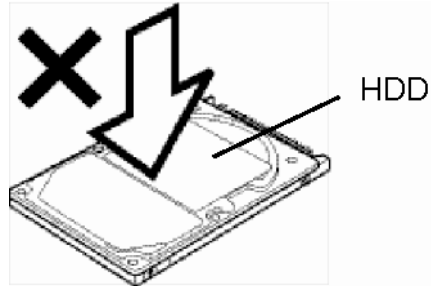
Installing the SD card

To install the SD card, follow the steps below and refer to Figure 4-4.

1. Insert the **SD card** in the card slot.
2. Push it carefully to ensure a firm connection.

4.5 HDD

CAUTION: When handling the HDD, do not press the top surface as shown by the arrow. Hold it by the sides.



Removing the HDD

To remove the HDD, follow the steps below and refer to Figure 4-5 to 4-7.

1. Turn the computer upside down.
2. Loosen the following screws and remove the **HDD cover** while releasing latches.

- M2.5×10B FLAT HEAD screw ×2

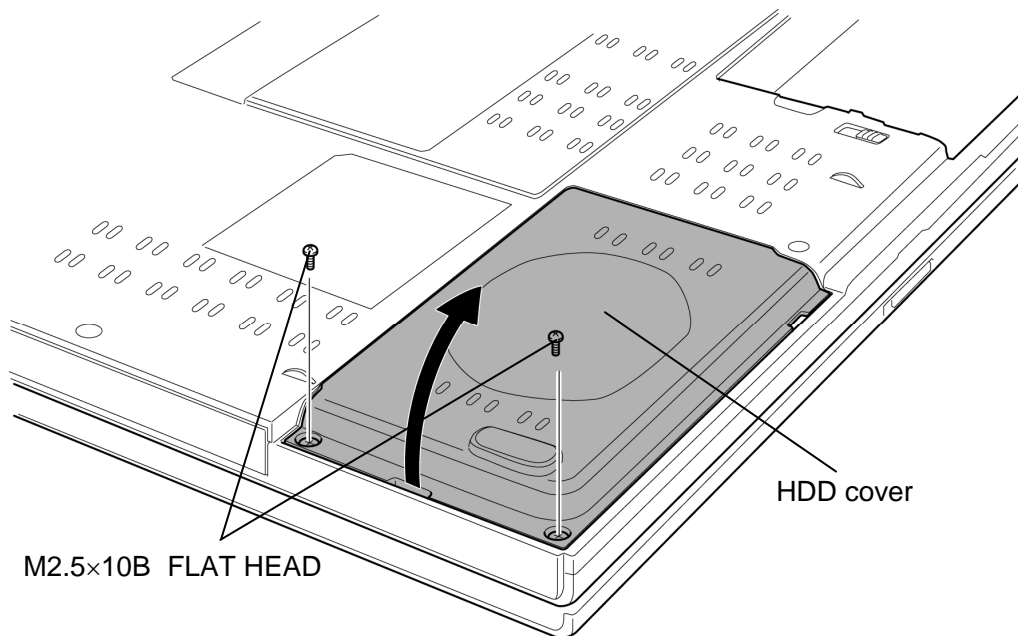


Figure 4-5 Removing the HDD cover

3. Remove the **HDD assembly** from the connector of the **HDD cable**. Be careful not to damage the connector.

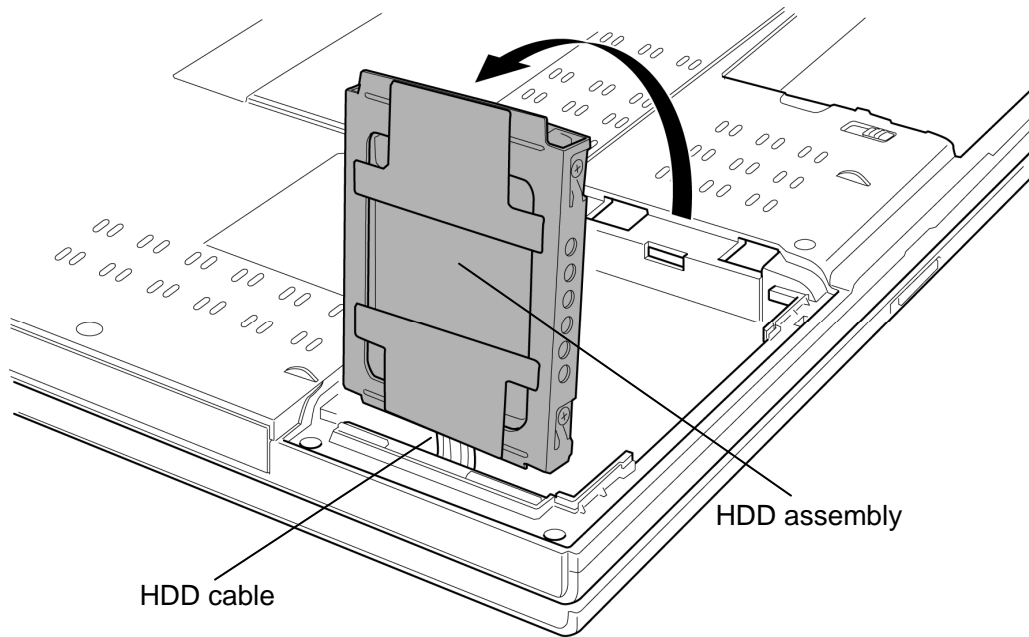


Figure 4-6 Removing the HDD assembly

NOTE: The following steps describe how to disassemble the HDD assembly, however, do not disassemble if the HDD is working properly.

4. Place the HDD assembly on a flat surface, and remove the following screws.
 - M3×4C FLAT HEAD screw ×4
5. Separate the **HDD** and **HDD Holder**.

CAUTION: Do not apply pressure to the top or bottom of the HDD.

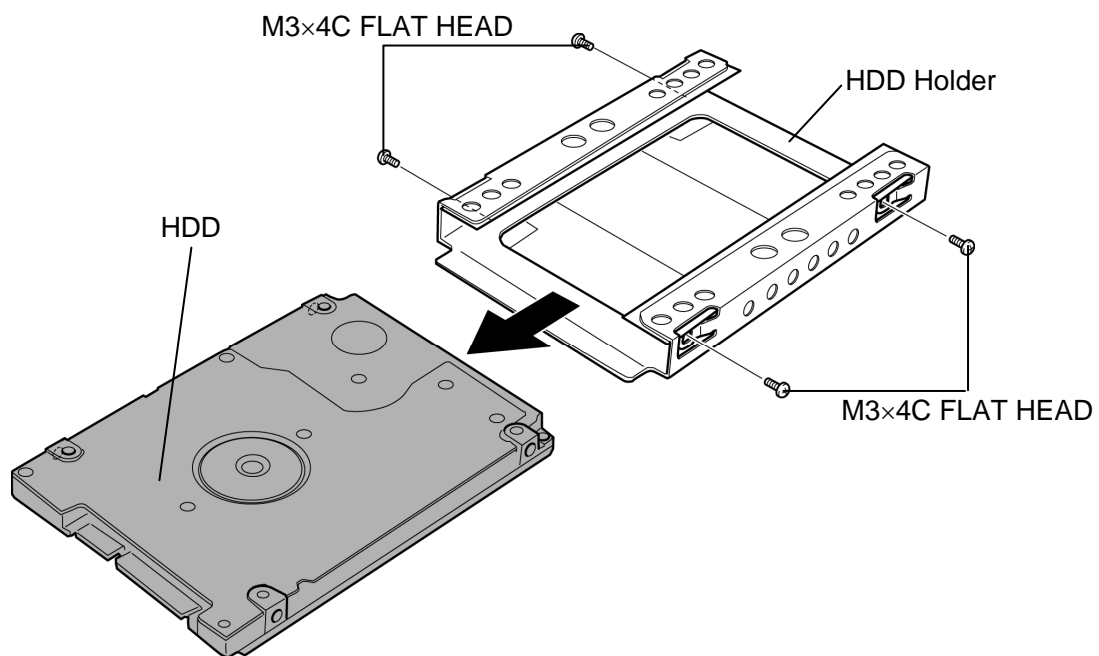


Figure 4-7 Separating the HDD and HDD holder

Installing the HDD

To install the HDD, follow the steps below and refer to Figure 4-5 to 4-7.

CAUTION: Do not hold the HDD by its top and bottom flat surfaces. It may damage the HDD.

1. Install the **HDD** to the **HDD Holder** and secure them with the following **screws**.

- M3×4C FLAT HEAD screw ×4

CAUTION: Do not apply pressure to the center of the HDD assembly. It may damage the HDD assembly. Hold the HDD assembly by its corners.

2. Set the connector of the **HDD cable** upward and connect the **HDD assembly** to the connector of the HDD cable. Lay the HDD assembly down in the slot.

3. Install the **HDD cover** and secure it with the following **screws**.

- M2.5×10B FLAT HEAD screw ×2

4.6 MDC/Memory module

Removing the MDC/Memory module

To remove the MDC/memory module, follow the steps below and refer to Figure 4-8 and 4-9.

1. Loosen the **screw** (with a washer) and remove the **MDC/memory cover**.
2. Remove the following **screws** securing the MDC.
 - M2×4B BIND screw ×2
3. Lift up the **insulator** and disconnect the **MDC** from the **CN3010** on the system board.
4. Disconnect the **MDC cable** from the connector on the MDC.

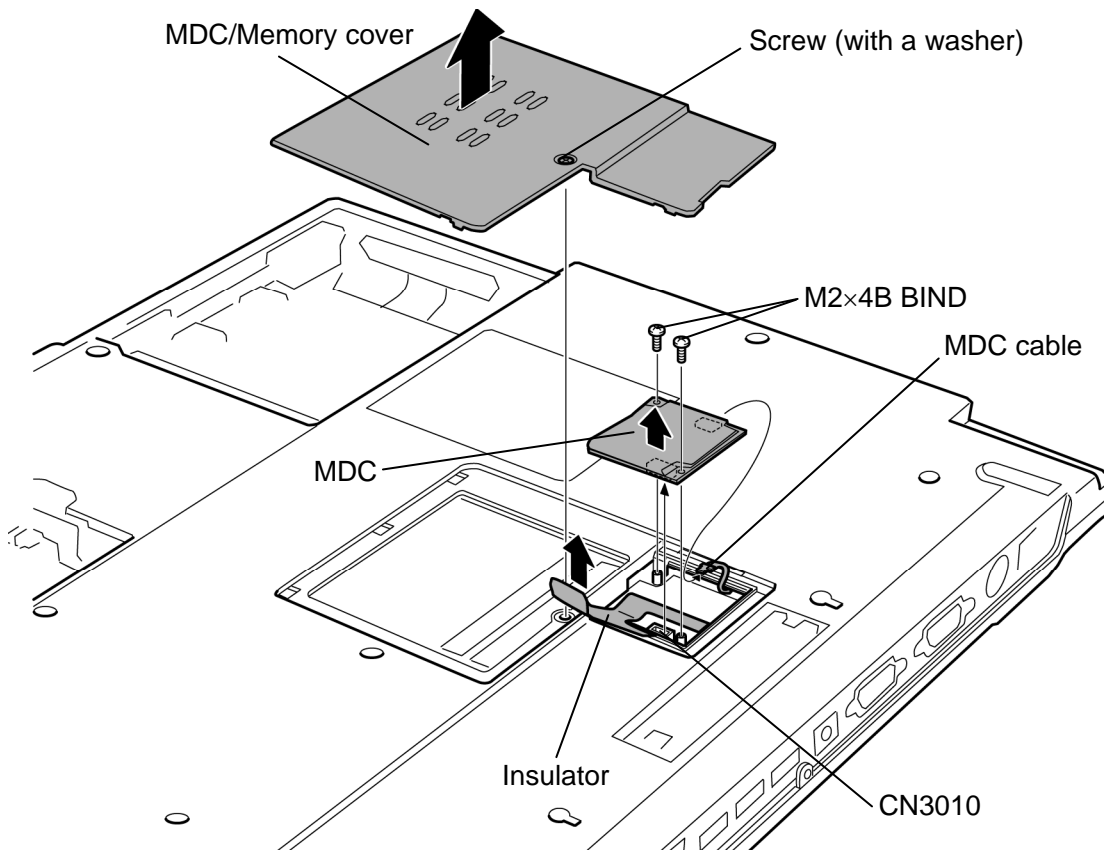


Figure 4-8 Removing the MDC

5. Open two **latches** to release them.
6. Grasp both sides of the **memory module** and lift it up slantwise to remove.

CAUTION: When removing the memory module, make sure the computer is in boot mode and powered off.
Never press hard or bend the memory module.

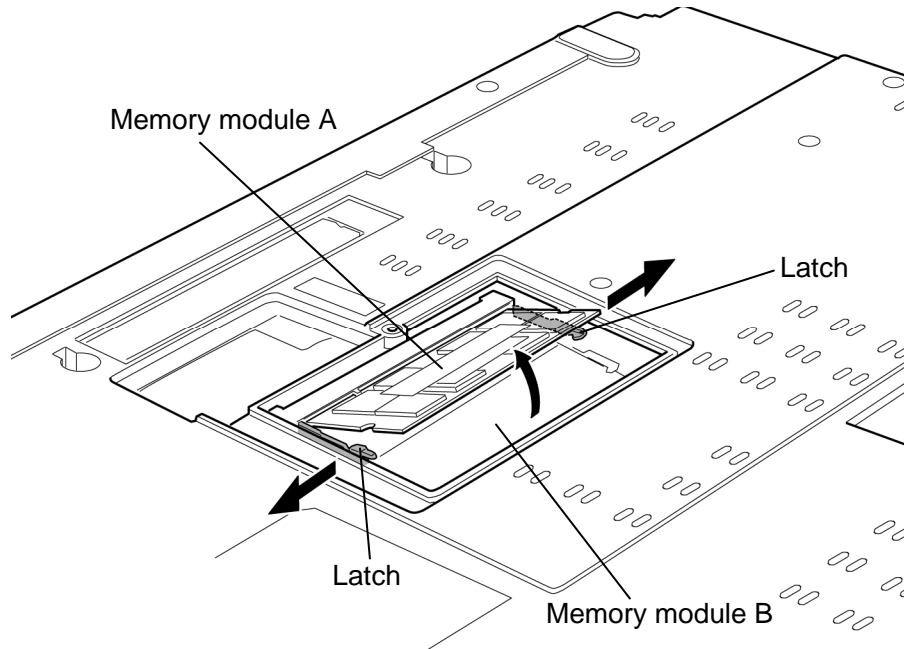


Figure 4-9 Removing the memory module

Installing the MDC/Memory module

To install the MDC/memory module, follow the steps below and refer to Figure 4-8 and 4-9.

CAUTION: *When installing the memory module, make sure the computer is in boot mode and powered off. Inserting a memory module with the power on might damage the module or the computer itself.*

When installing only one memory module, be sure to insert it into the slot A. Otherwise, the computer or the memory may not work properly.

Do not touch the connectors on the memory module or on the computer. Dust and stains on the connectors may cause memory access problems.

1. Insert the **memory module** into the connector slantwise and press it to connect firmly.
2. Press down the memory module until it is latched firmly.

NOTE: *When the power of the computer is turned on, the computer checks automatically the memory size. Confirm that the new memory is detected correctly. If the memory is not detected, check that it is connected correctly.*

3. Connect the **MDC cable** to the connector on the MDC.
4. Peel up the **insulator** and connect the **MDC** to the connector **CN3010** on the system board by pressing it carefully. Be careful not to damage the MDC and connector.
5. Secure the MDC with the following **screws**.
 - M2×4B BIND screw ×2
6. Install the **MDC/memory cover** and secure it with the **screw** (with a washer).

4.7 Keyboard

Removing the Keyboard

To remove the keyboard, follow the steps below and refer to Figure 4-10 and 4-11.

1. Turn over the computer.
2. Open the display and make it flat.
3. Insert your finger tip into the **slit** on either side and remove the **keyboard holder**.
4. Remove the following **screws** securing the keyboard.
 - M2.5×4B FLAT HEAD screw ×2
5. Lift the top edge of the **keyboard** while releasing the **hook** and turn the keyboard face down on the palm rest.

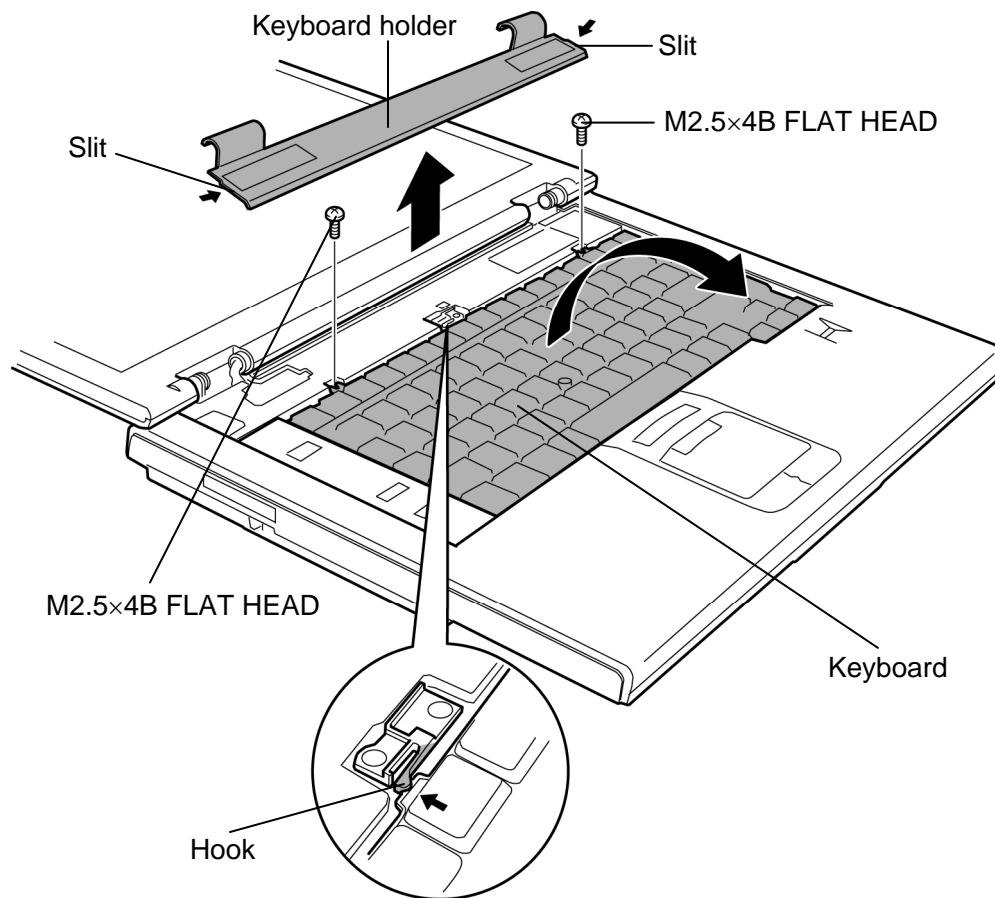


Figure 4-10 Removing the keyboard (1)

6. Remove the following screw and **keyboard support plate**.
 - M2.5×6B FLAT HEAD screw ×1
7. Disconnect the **keyboard cable** from the connector **CN3230** on the system board and remove the **keyboard**.

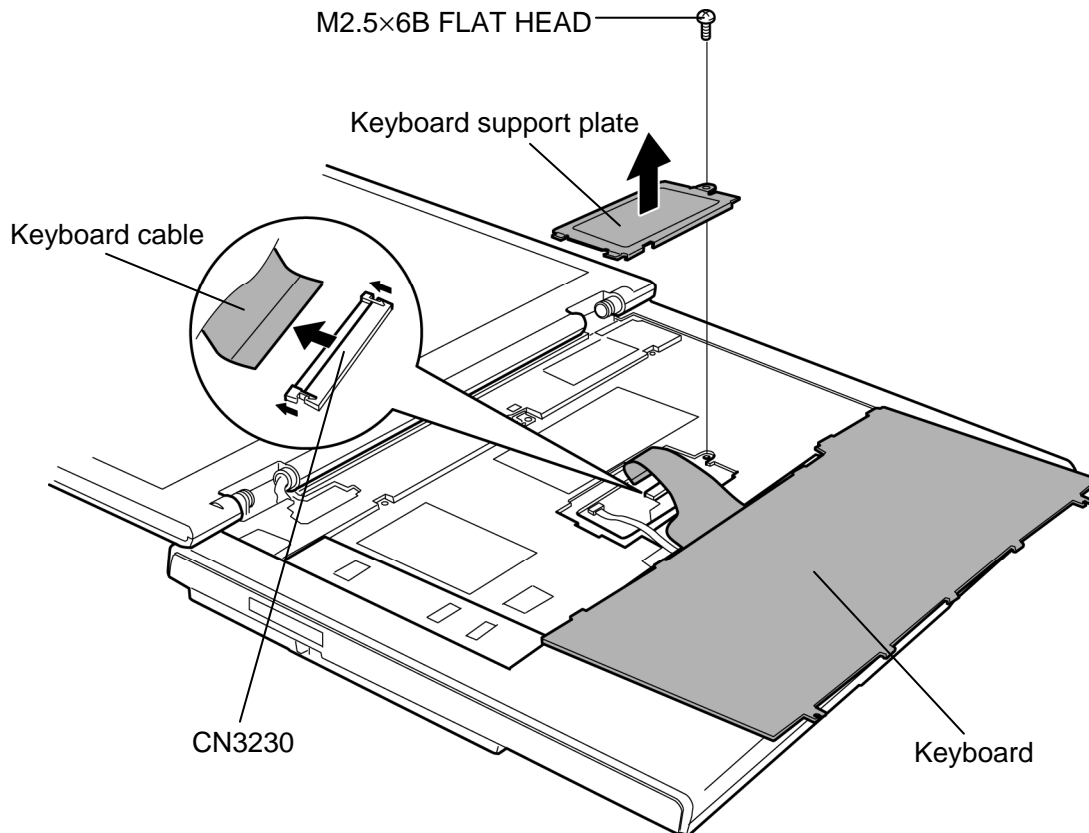


Figure 4-11 Removing the keyboard (2)

Installing the Keyboard

To install the keyboard, follow the steps below and refer to Figure 4-10 and 4-11.

1. Place the keyboard face down on the palm rest.
2. Connect the **keyboard cable** to the connector **CN3230** on the system board.
3. Install the **keyboard support plate** and secure it with the following **screw**.
 - M2.5×6B FLAT HEAD screw ×1
4. Turn the **keyboard** face up and set it in place.
5. Secure the **keyboard** with the following **screws**.
 - M2.5×4B FLAT HEAD screw ×2
6. Install the **keyboard holder** and press to secure the latches.

4.8 Optical drive

Removing the Optical drive

To remove the optical drive, follow the steps below and refer to Figure 4-12 and 4-13.

CAUTION: Do not put fingers inside the optical drive. It may cause injury.

1. Turn over the computer and remove the following **screw** securing the optical drive.
 - M2.5×6B FLAT HEAD screw ×1
2. Turn over the computer and open the display.
3. Peel off the **insulator** and remove the **optical drive** from the connector on the system board while pushing it in the direction of the arrow in the figure below.

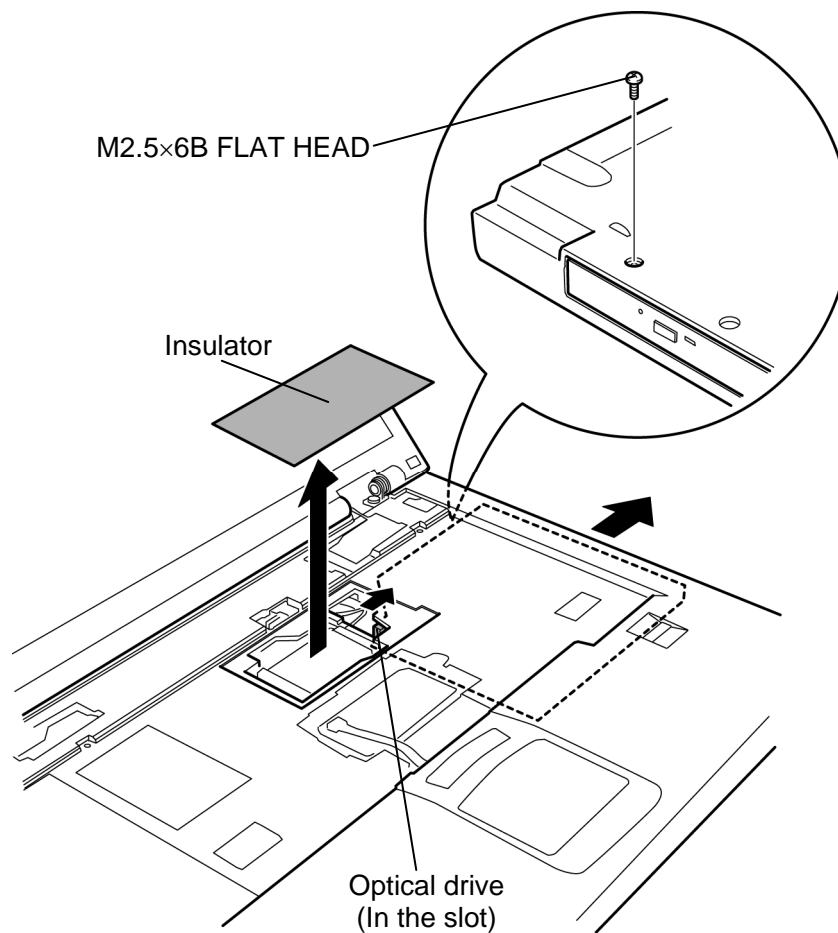


Figure 4-12 Removing the optical drive

4. Remove the following **screws** and **pushing plate**.
 - M2×2.7C S-THIN HEAD screw ×2
5. Remove the following **screw** and **mounting plate**.
 - M2×3C BIND screw ×1

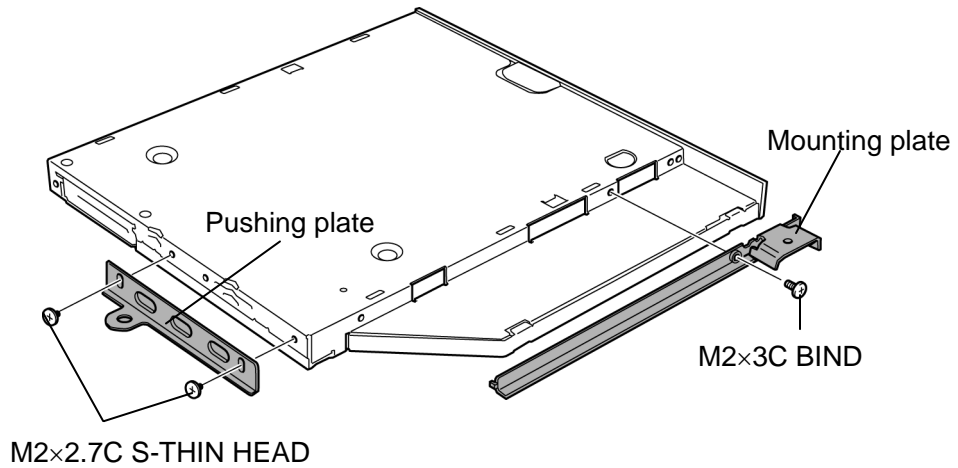


Figure 4-13 Disassembling the optical drive

Installing the Optical drive

To install the optical drive, follow the steps below and refer to Figure 4-12 and 4-13.

1. Set the **mounting plate** and secure it with the following **screw**.
 - M2×3C BIND screw ×1
2. Set the **pushing plate** and secure it with the following **screws**.
 - M2×2.7C S-THIN HEAD screw ×2
3. Insert the **optical drive** firmly into the computer to connect it to the connector on the system board.
4. Stick the **insulator** in place.
5. Turn over the computer and secure the **optical drive** with the following **screw**.
 - M2.5×6B FLAT HEAD screw ×1

4.9 Wireless LAN card

Removing the Wireless LAN card

To remove the wireless LAN card, follow the steps below and refer to Figure 4-14.

1. Disconnect the **wireless LAN antenna cables** (black and white) from the wireless LAN card using an antenna coaxial cable disconnecter.
2. Remove the following **screw** and **wireless LAN card cover**.
 - M2×4B BIND or Security torx screw ×1
3. Remove the following **screw** securing the **wireless LAN card**.
 - M2×3C BIND screw ×1
4. With grasping both the sides, disconnect the **wireless LAN card** from the connector **CN2600** on the system board.

CAUTION: Do not touch the connectors on the wireless LAN card and computer. When the foreign body adheres to the connector, it might cause the breakdown.

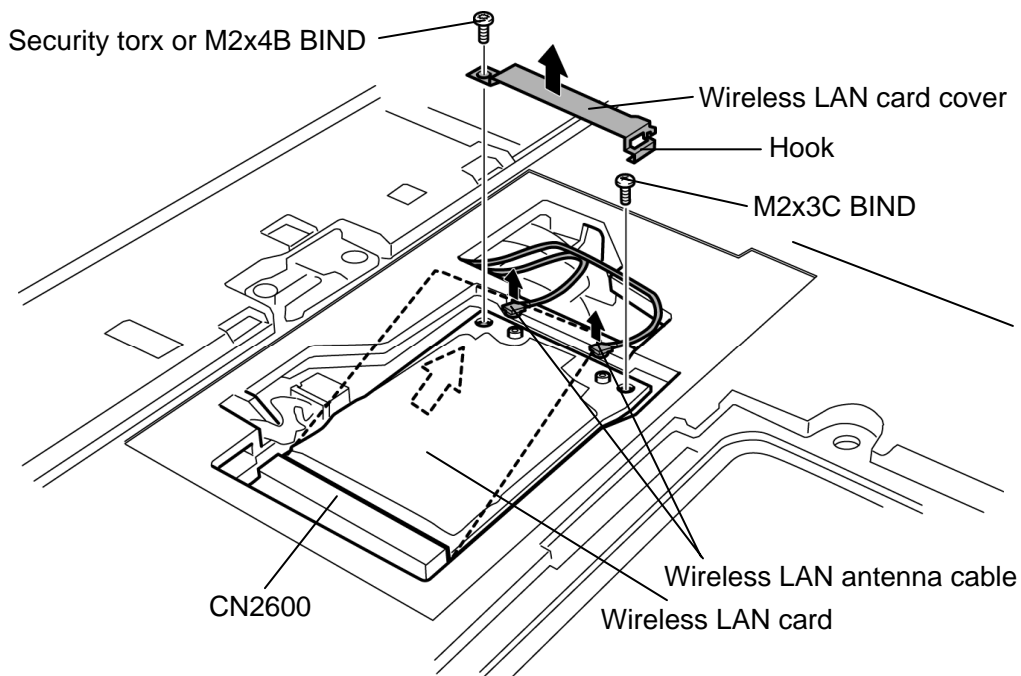


Figure 4-14 Removing the wireless LAN card

Installing the Wireless LAN card

To install the wireless LAN card, follow the steps below and refer to Figure 4-14.

1. Insert slantingly the **wireless LAN card** into the connector **CN2600** on the system board.

CAUTION: *Insert the slits of the wireless LAN card according to the guide of the slot.*

2. Gently push the **wireless LAN card** down and secure it with the following **screw**.
 - M2×3C BIND screw ×1
3. Seat the **wireless LAN card cover** in place and secure it with the following **screw**.
 - M2×4B BIND or Security torx screw ×1
4. Connect the **wireless LAN antenna cables** (black and white) to the connectors on the wireless LAN card.

4.10 Cover assembly

Removing the Cover assembly

To remove the cover assembly, follow the steps below and refer to Figure 4-15 to 4-17.

1. Peel off the **insulator** and disconnect the **SD card slot cable** and **SW membrane cable** from the connector **CN9720** and **CN9721** on the system board.
2. Disconnect the **touch pad cable**, **fingerprint sensor cable**, **speaker cable**, **Bluetooth cable** and **LCD cable** from the connector **CN3240**, **CN9700**, **CN6170**, **CN4400** and **CN5000** on the system board.
3. Peel off the **glass tape** and remove the following screw.
 - M2.5×6B FLAT HEAD screw ×1

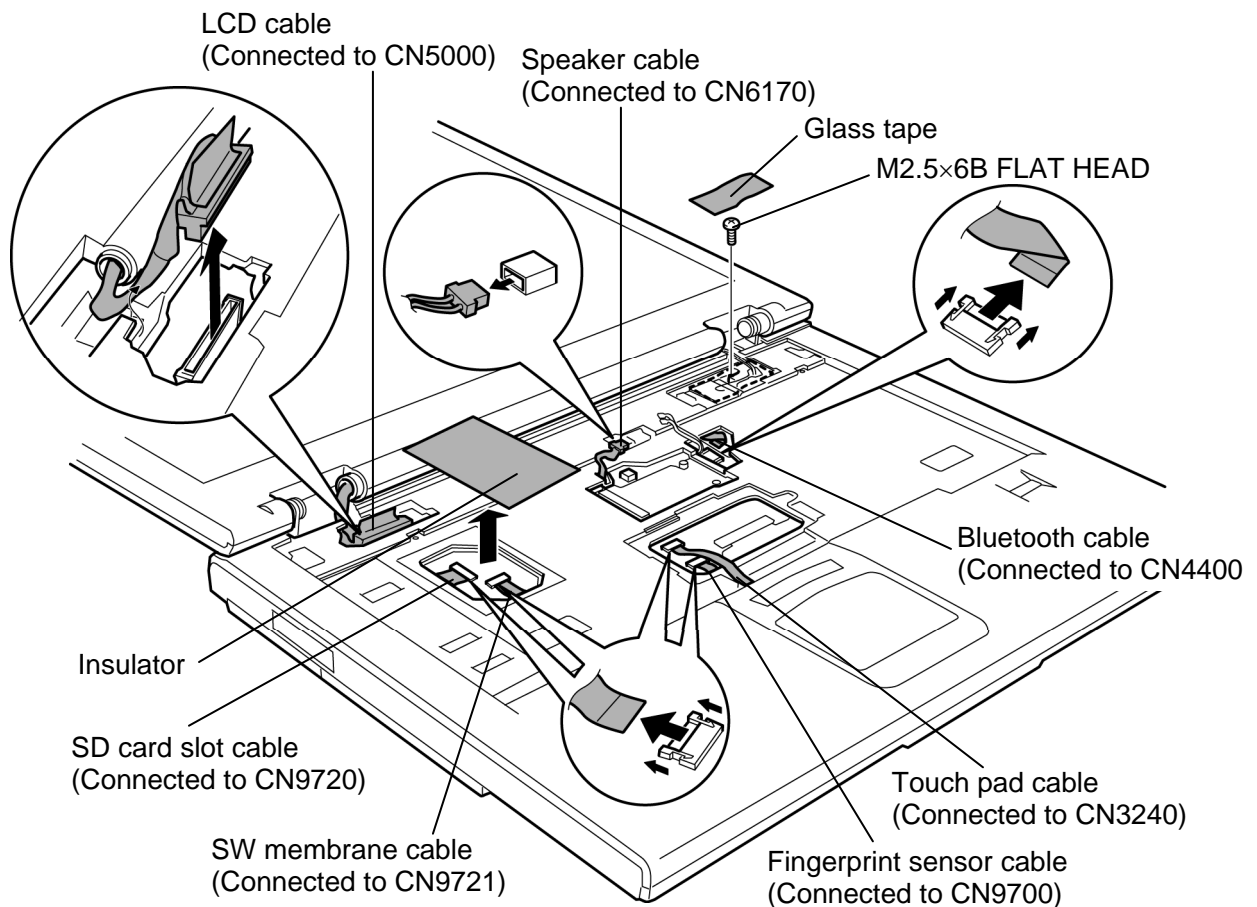


Figure 4-15 Removing the cover assembly (1)

4. Turn the computer face down and remove the following **screws** on the bottom.
- M2.5×5B FLAT HEAD screw ×1 (“5” in the figure below)
 - M2.5×6B FLAT HEAD screw ×11 (“6” in the figure below)
 - M2.5×10B FLAT HEAD screw ×3 (“10” in the figure below)
 - M2.5×16B FLAT HEAD screw ×3 (“16” in the figure below)

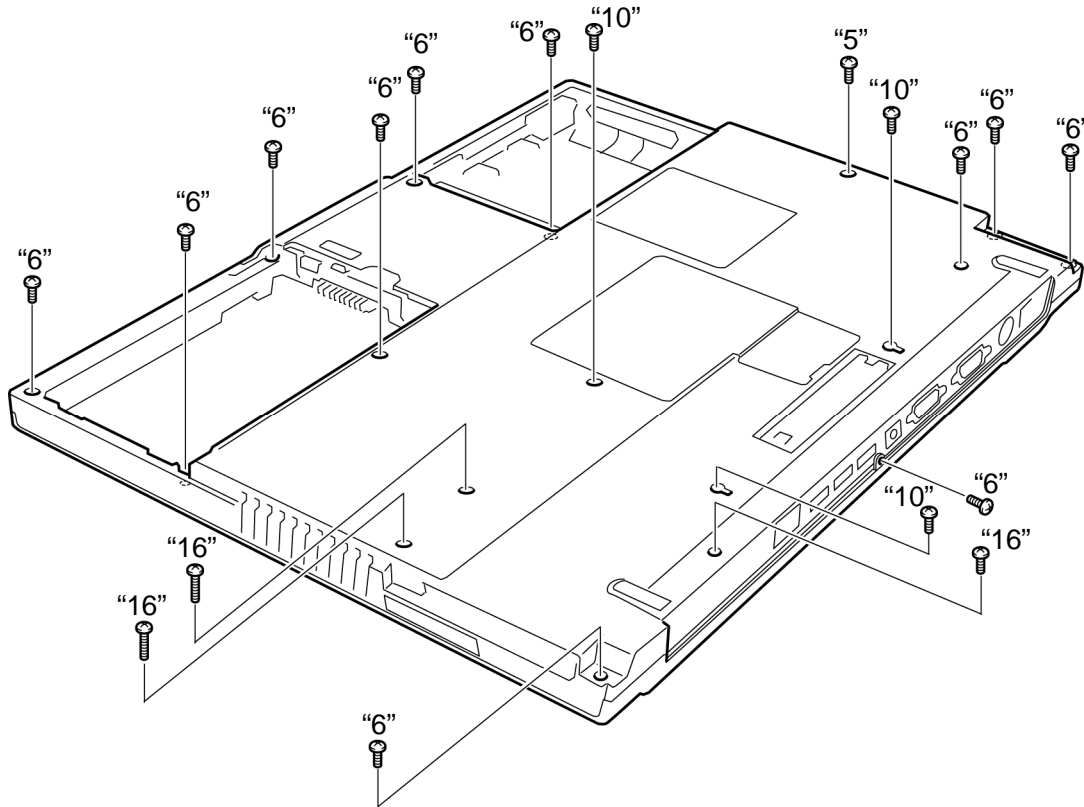


Figure 4-16 Removing the cover assembly (2)

5. Turn the computer face up and open the display.
6. While releasing the latches on both sides, lift up the **cover assembly** to remove.

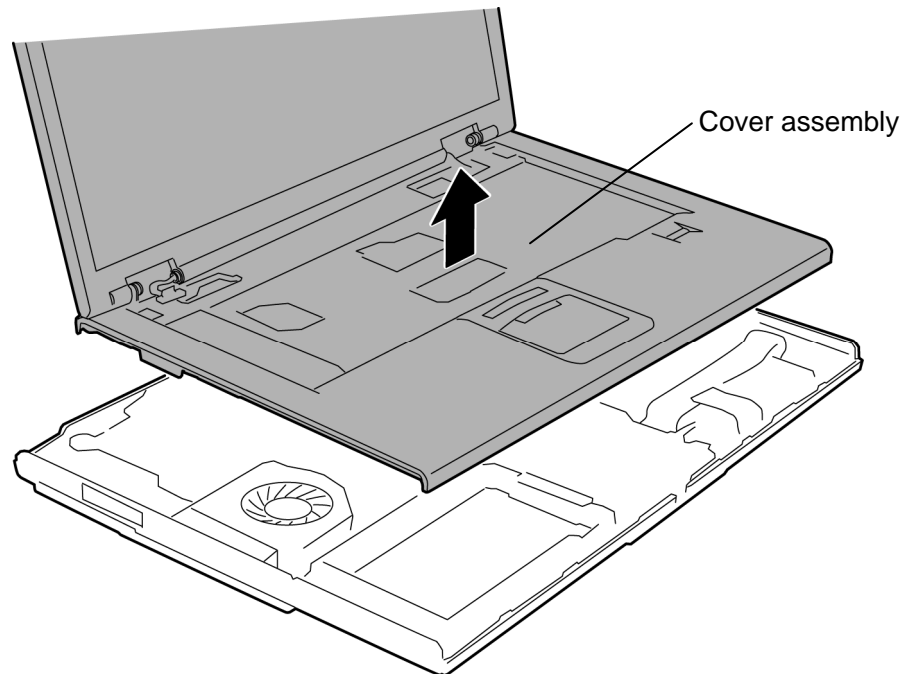


Figure 4-17 Removing the cover assembly (3)

Installing the Cover assembly

To install the cover assembly, follow the steps below and refer to Figure 4-15 to 4-17.

1. Place the **cover assembly** on the **base assembly** and secure the latches.
2. Secure the cover assembly with the following **screw** and stick the **glass tape**.
 - M2.5×6B FLAT HEAD screw ×1
3. Connect the **touch pad cable**, **fingerprint sensor cable**, **speaker cable**, **Bluetooth cable** and **LCD cable** to the connector **CN3240**, **CN9700**, **CN6170**, **CN4400** and **CN5000** on the system board.
4. Connect the **SD card slot cable** and **SW membrane cable** to the connector **CN9720** and **CN9721** on the system board. and stick the **insulator**.
5. Close the display and turn over the computer.
6. Secure the cover assembly with the following **screws**.
 - M2.5×5B FLAT HEAD screw ×1 (“5” in the figure 4-15)
 - M2.5×6B FLAT HEAD screw ×11 (“6” in the figure 4-15)
 - M2.5×10B FLAT HEAD screw ×3 (“10” in the figure 4-15)
 - M2.5×16B FLAT HEAD screw ×3 (“16” in the figure 4-15)

4.11 SW membrane

Removing the SW membrane

To remove the SW membrane, follow the steps below and refer to Figure 4-18 and 4-19.

1. Remove the **switch cover** while releasing latches.

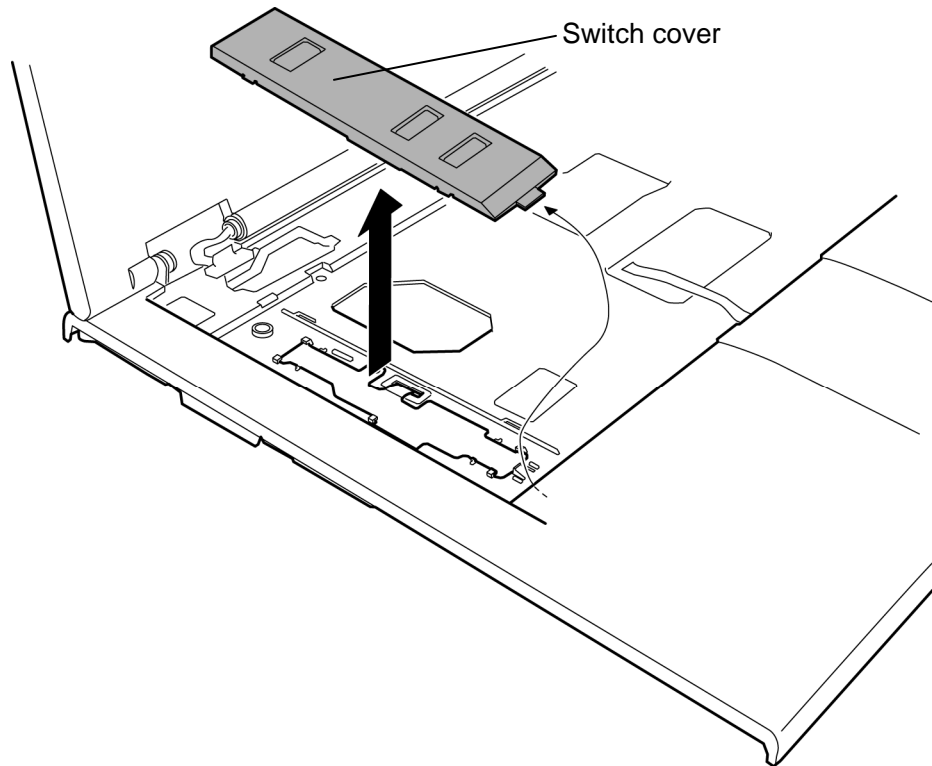


Figure 4-18 Removing the switch cover

2. Push down the **hook** and slide the **SW membrane** in the direction in the figure below.
3. Remove the **SW membrane**.

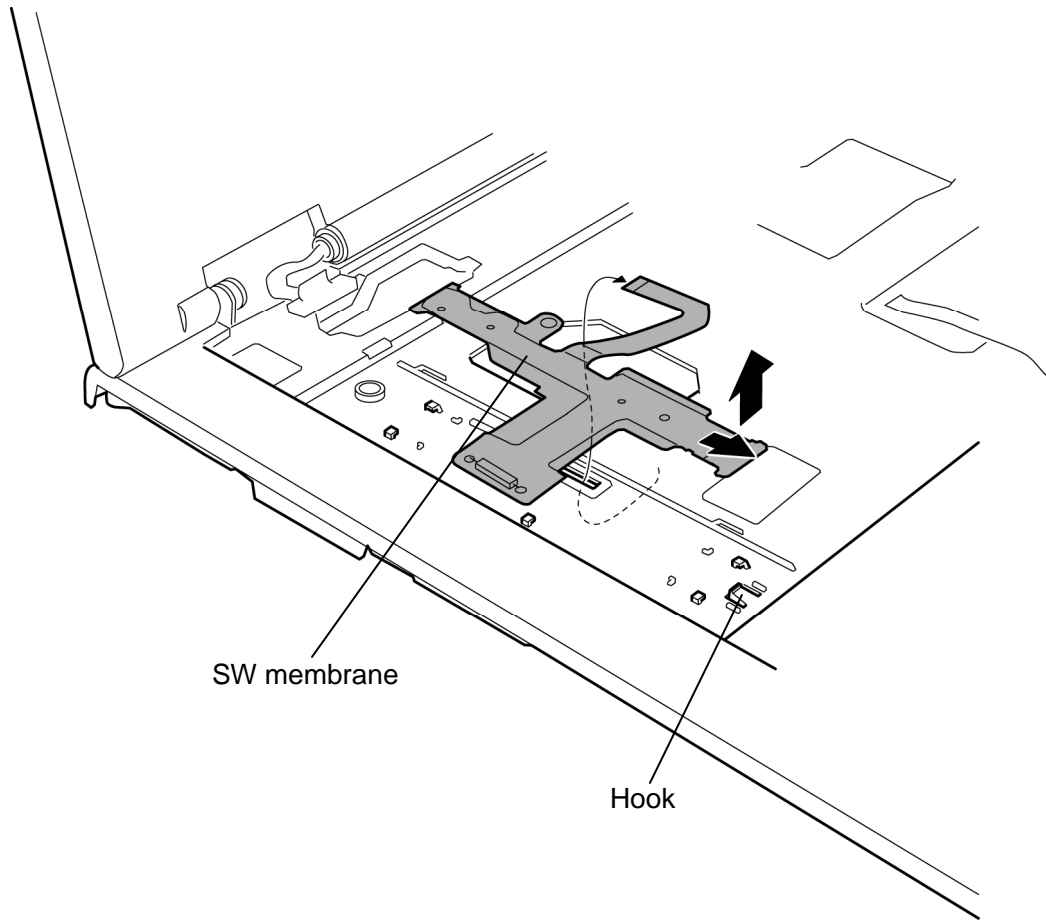


Figure 4-19 Removing the SW membrane

Installing the SW membrane

To install the SW membrane, follow the steps below and refer to Figure 4-18 and 4-19.

1. Install the **SW membrane** to the slot while sliding it in the opposite direction in removing.
2. Install the **switch cover** while engaging latches.

4.12 Fingerprint sensor board

Removing the Fingerprint sensor board

To remove the fingerprint sensor board, follow the steps below and refer to Figure 4-20.

1. Turn up the **insulator** and peel off the **glass tape**.
2. Remove the **fingerprint sensor board hold plate** while sliding it in the direction of the arrow in the figure below.
3. Remove the **fingerprint sensor board** fixed with the **double-sided tape** and peel off the tape that prevents a waterdrop from entering the computer.
4. Disconnect the **fingerprint sensor cable** from the connector on the fingerprint sensor board.

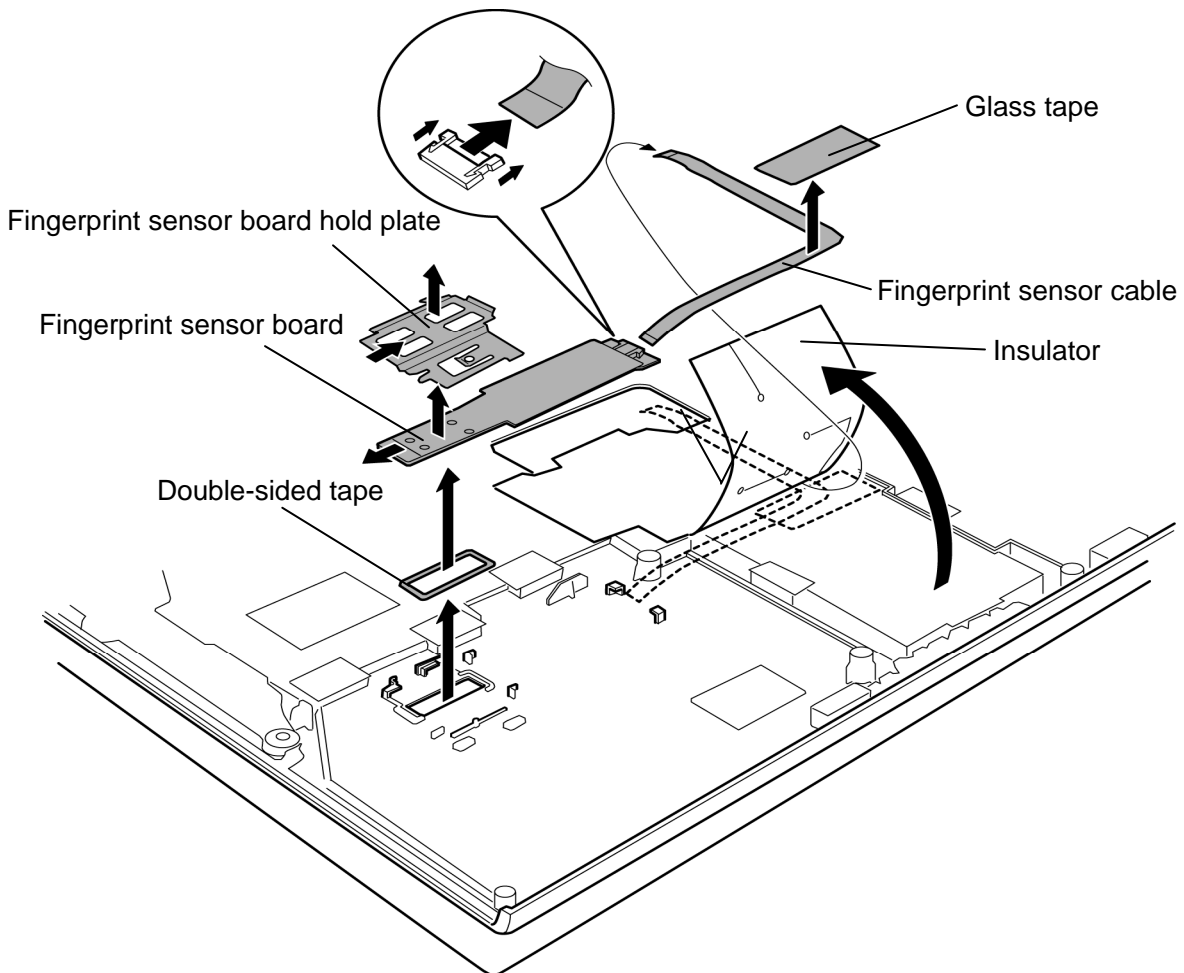


Figure 4-20 Removing the fingerprint sensor board

Installing the Fingerprint sensor board

To install the fingerprint sensor board, follow the steps below and refer to Figure 4-20.

1. Connect the **fingerprint sensor cable** to the connector on the fingerprint sensor board.
2. Stick a new **double-sided tape** in place and install the **fingerprint sensor board** while inserting it to the guides.

CAUTION: Do not reuse the removed double-sided tape.

3. Install the **fingerprint sensor board hold plate** while sliding it to the guides.
4. Arrange the **fingerprint sensor cable** and stick the **glass tape** while turning up the **insulator**.

4.13 Touch pad

Removing the Touch pad

To remove the touch pad, follow the steps below and refer to Figure 4-21 and 4-22.

1. Remove the following screws securing the **touch pad assembly**.

- M2×5B FLAT HEAD screw ×3 (Touch pad) or ×2 (Dual pad)

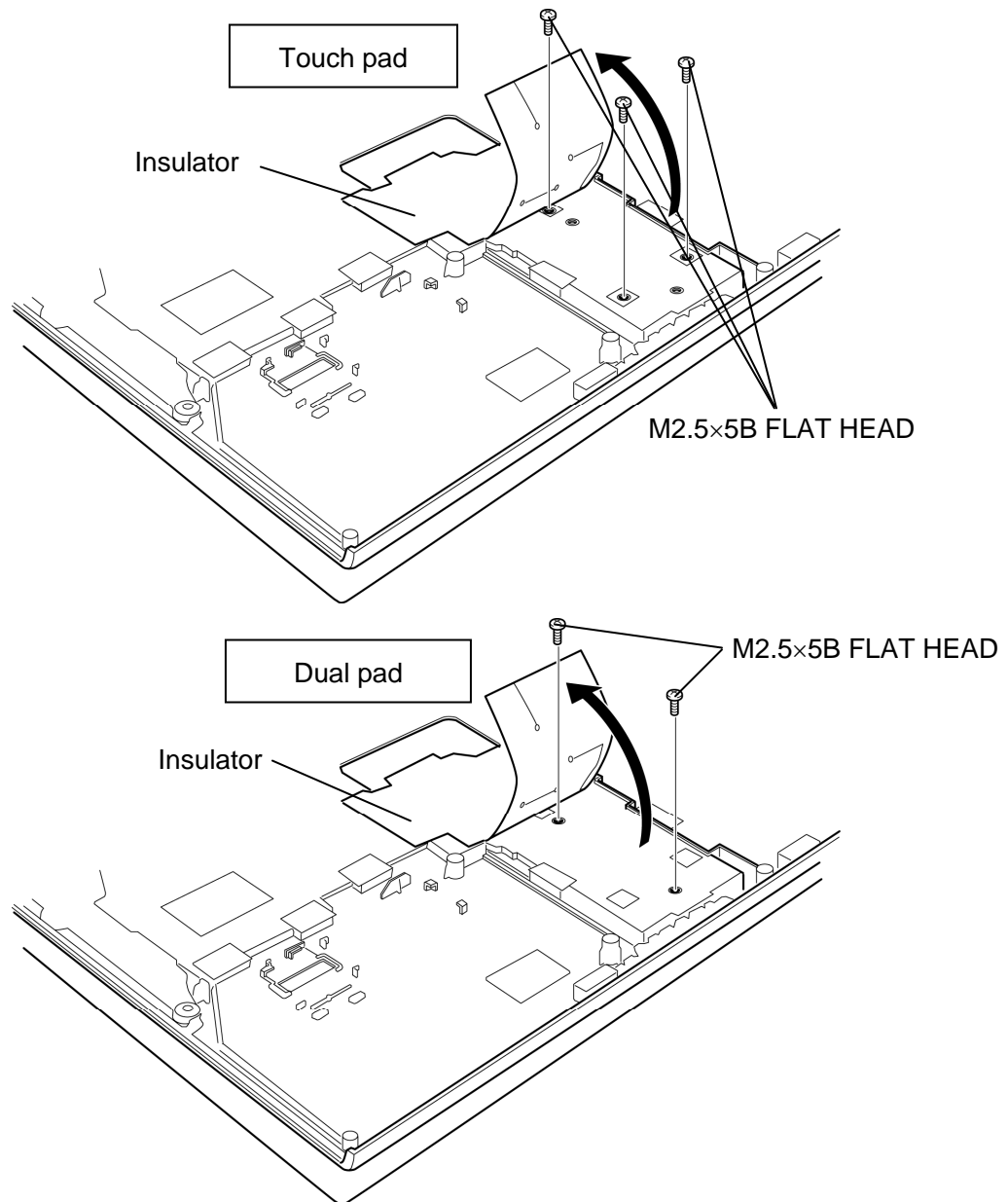


Figure 4-21 Removing the touch pad (1)

2. Turn over the cover assembly and remove the **touch pad cover** while releasing latches.
3. Remove the **touch pad assembly** from the slot.
4. Peel off the **glass tape** and disconnect the **touch pad cable** from the connector on the touch pad assembly.

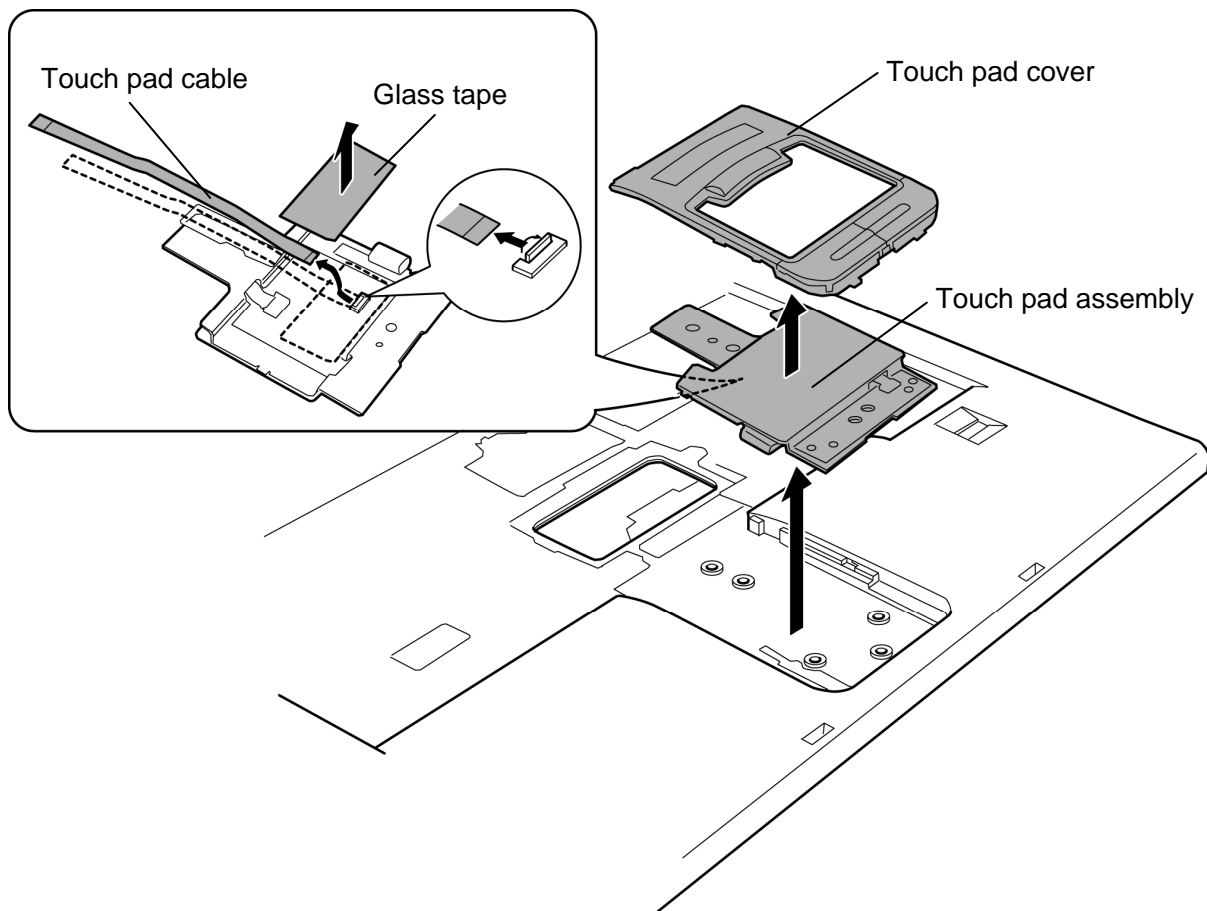


Figure 4-22 Removing the touch pad (2)

Installing the Touch pad

To install the touch pad, follow the steps below and refer to Figure 4-21 and 4-22.

1. Connect the **touch pad cable** to the connector on the touch pad and stick the **glass tape**.
2. Seat the **touch pad assembly** to the slot.
3. Install the **touch pad cover** while engaging latches.
4. Secure the **touch pad assembly** with the following **screws**.
 - M2×5B FLAT HEAD screw ×3 (Touch pad) or ×2 (Dual pad)

CAUTION: *When securing the touch pad assembly with screws, move the touch pad cover to the front side.*

4.14 SD card slot

Removing the SD card slot

To remove the SD card slot, follow the steps below and refer to Figure 4-23.

1. Remove the following **screw** and **SD card slot**.
 - M2×5B FLAT HEAD screw ×1
2. Disconnect the **SD card slot cable** from the SD card slot.

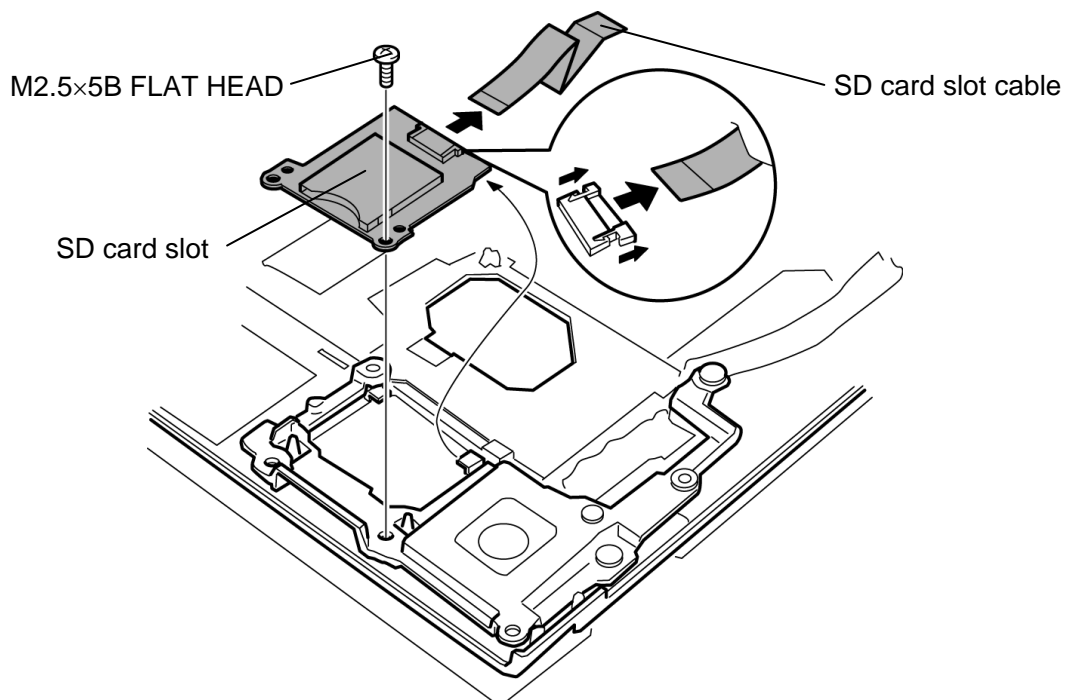


Figure 4-23 Removing the SD card slot

Installing the SD card slot

To install the SD card slot, follow the steps below and refer to Figure 4-23.

1. Connect the **SD card slot cable** to the SD card slot.
2. Install the **SD card slot** to the slot and secure it with the following **screw**.
 - M2×5B FLAT HEAD screw ×1

4.15 Bluetooth module

Removing the Bluetooth module

To remove the Bluetooth module, follow the steps below and refer to Figure 4-24.

1. Turn over the cover assembly and disconnect the **Bluetooth antenna cable** from the Bluetooth module.
2. Push the **hook** in the direction in the following figure to unlatch from the back of the cover assembly and remove the **Bluetooth module** from the slot.
3. Disconnect the **Bluetooth cable** from the connector on the Bluetooth module.

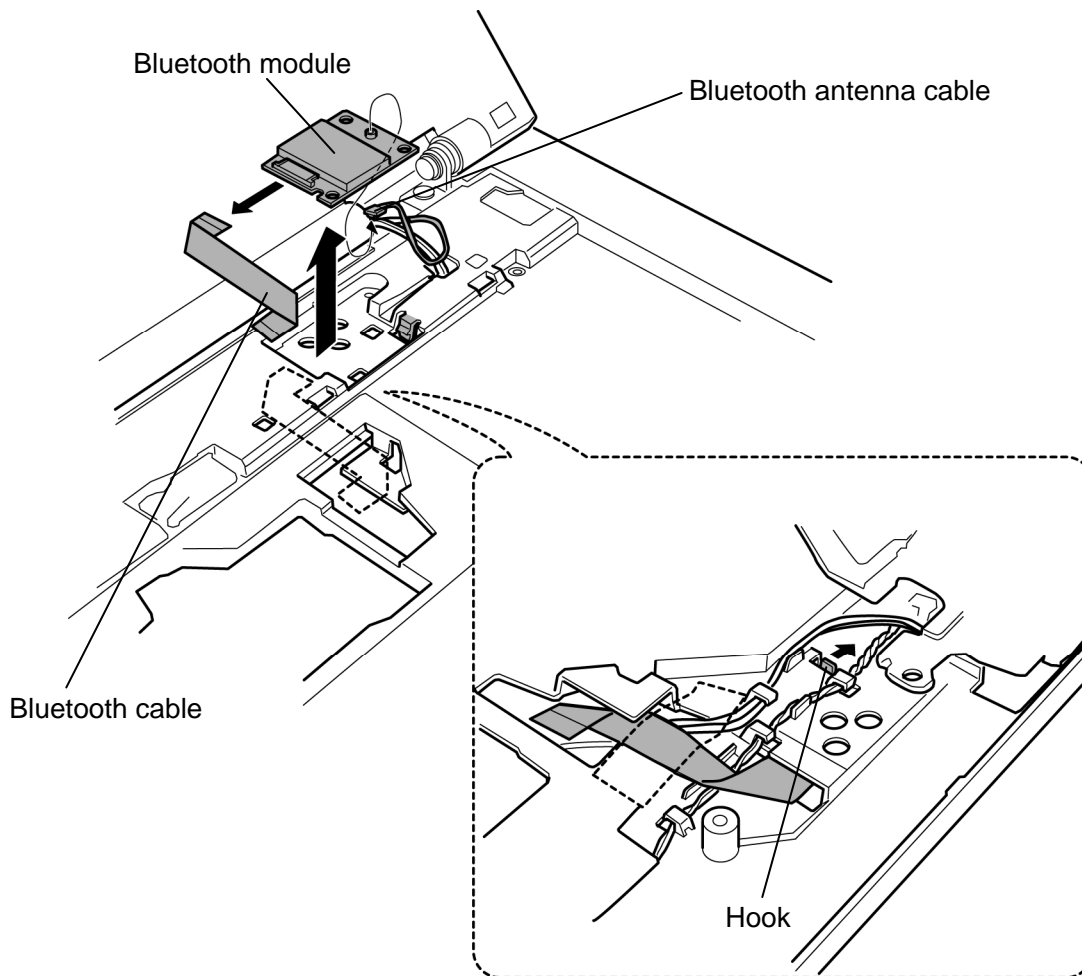


Figure4-24 Removing the Bluetooth module

Installing the Bluetooth module

To install the Bluetooth module, follow the steps below and refer to Figure 4-24.

1. Connect the **Bluetooth cable** to the connector on the Bluetooth module.
2. Install the **Bluetooth module** to the slot until the **hook** latches.
3. Connect the **Bluetooth antenna cable** to the connector on the Bluetooth module.
4. Turn over the cover assembly and arrange the **Bluetooth antenna cable** and **Bluetooth cable** in place.

4.16 Serial/S-Video board

Removing the Serial/S-Video board

To remove the serial/s-video board, follow the steps below and refer to Figure 4-25.

1. Remove the following screw and **serial/s-video board**.
 - M2.5×6C Tapping screw ×1
2. Disconnect the **serial/s-video board cable** from the connector **CN9600** on the system board and **CN9610** on the serial/s-video board.

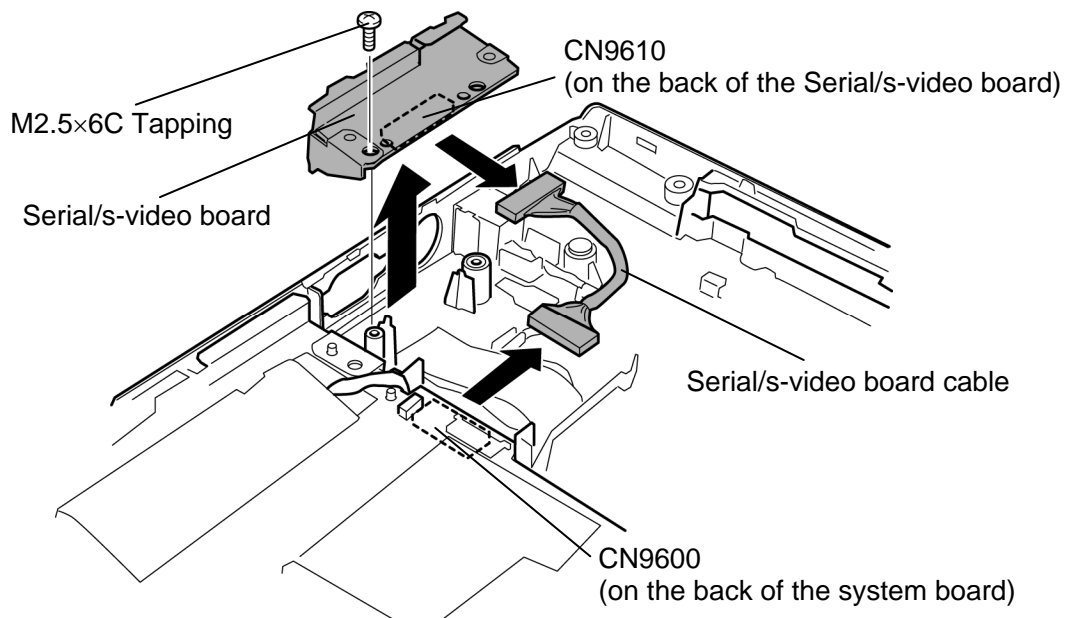


Figure 4-25 Removing the serial/s-video board

Installing the Serial/S-Video board

To install the serial/s-video board, follow the steps below and refer to Figure 4-25.

1. Connect the **serial/s-video board cable** to the connector **CN9600** on the system board and **CN9610** on the serial/s-video board.
2. Install the **serial/s-video board** to the slot of the base assembly and secure it with the following screw.
 - M2.5×6C Tapping screw ×1

4.17 RTC battery

WARNING: When replacing the RTC battery, be sure to use a genuine battery authorized by Toshiba. Installing the wrong battery could cause a battery explosion or other damage.

If the RTC battery is found abnormal, it must not be installed. Replace it with a new battery, and dispose of the old one according to the local regulations.

Check for any of the following signs of damage:

1) Electrolyte leakage

- Corrosion (greenish color) on the battery connector or cable
- Corrosion on the computer's battery connector
- White powder on any part of the battery
- White powder in the battery tray
- Clear liquid on the battery
- Clear liquid in the battery tray
- Clear liquid on any board near the battery

2) Damage to the connection cable

3) Damage to the connector housing

If any powder or liquid is found in or around the battery tray, clean it. Be careful not to let any leaked material contact your eyes or mouth. Do not inhale fumes from leaked material.

If leaked material contacts your skin, eyes or mouth, wash the affected area thoroughly with clean water.

Removing the RTC battery

To remove the RTC battery, follow the steps below and refer to Figure 4-26.

1. Peel off the **glass tape**.
2. Disconnect the **RTC battery cable** from the connector **CN9300** on the system board and remove the **RTC battery**.

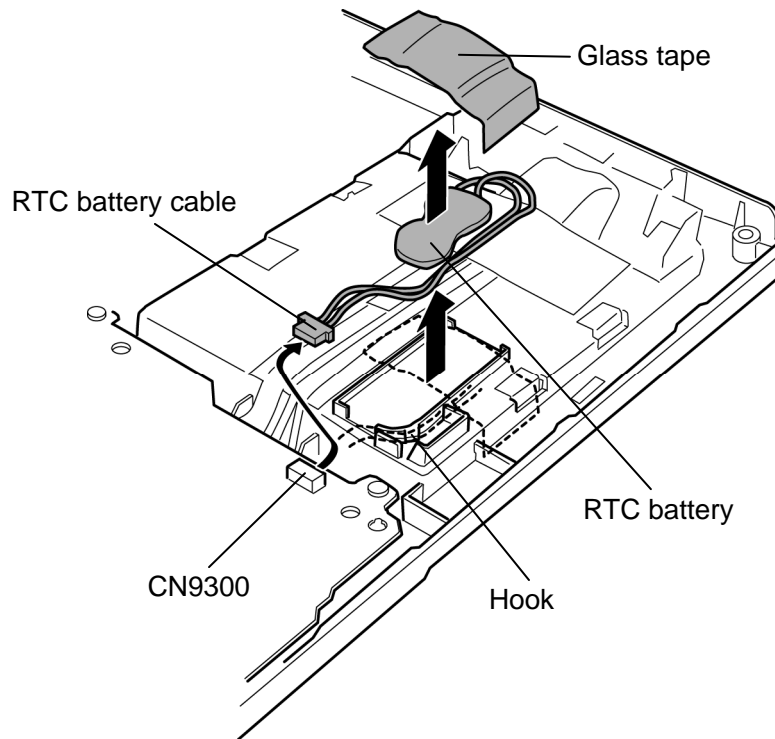


Figure 4-26 Removing the RTC battery

Installing the RTC battery

To install the RTC battery, follow the steps below and refer to Figure 4-26.

1. Connect the **RTC battery cable** to the connector **CN9300** on the system board.
2. Arrange the **RTC battery cable** while passing under the **hook**.
3. Seat the **RTC battery** in place and stick the **glass tape**.

4.18 Modem jack

To remove the modem jack, follow the steps below and refer to Figure 4-27.

1. Open the **insulator (A)** and **(B)**.
2. Remove the **modem jack** from the slot.
3. Disconnect the **modem jack cable** from the connector CN3011 on the system board.

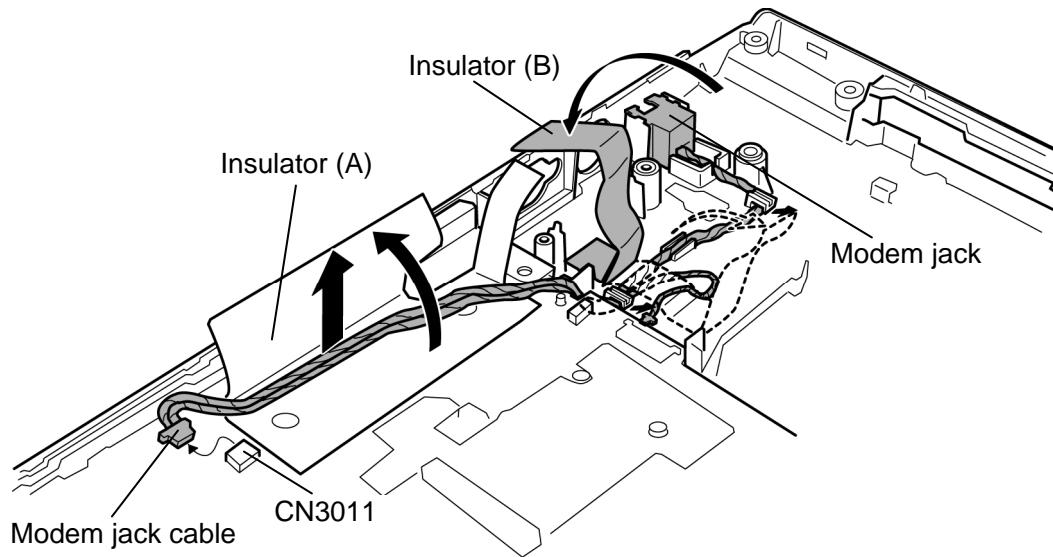


Figure 4-27 Removing the modem jack

Installing the modem jack

To install the modem jack, follow the steps below and refer to Figure 4-27.

1. Connect the **modem jack cable** to the connector CN3011 on the system board.
2. Arrange the **modem jack cable** in place.
3. Install the **modem jack** into the slot of the base assembly.
4. Secure the modem jack cable with the **insulator (A)** and **(B)** closed.

4.19 Fan

Removing the Fan

To remove the fan, follow the steps below and refer to Figure 4-28.

1. Remove the **glass tape** and disconnect the **fan cable** from the connector **CN8771** on the system board.
2. Remove the following **screws** and **fan** from the slot.
 - M2.5×6C Tapping screw ×2

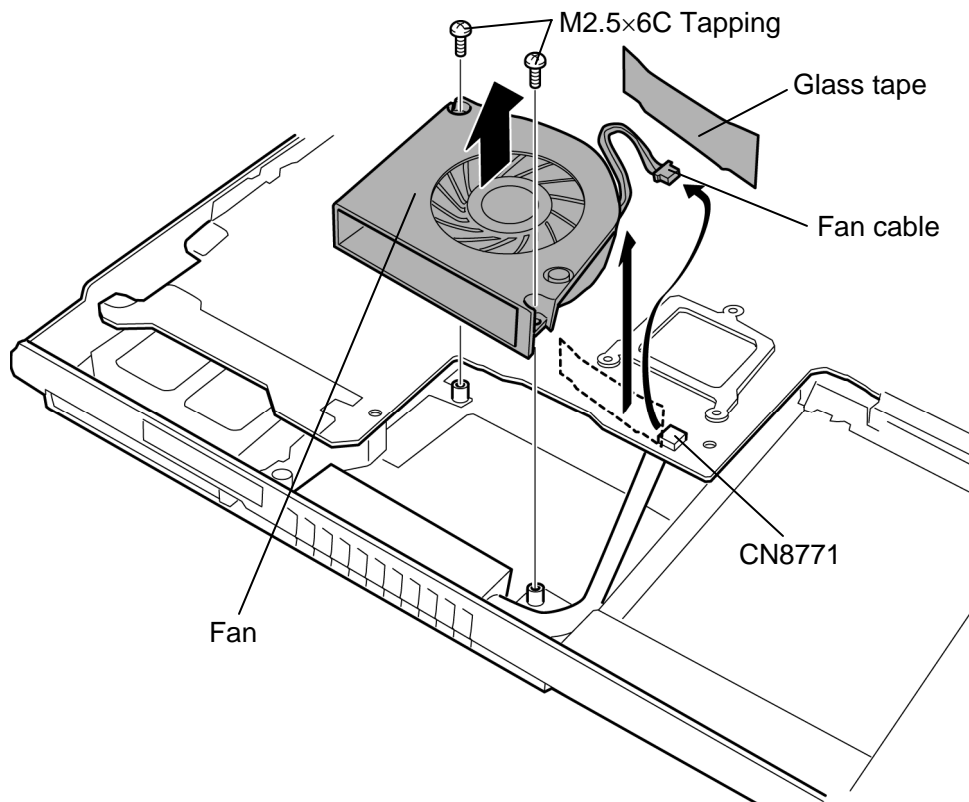


Figure 4-28 Removing the fan

Installing the Fan

To install the fan, follow the steps below and refer to Figure 4-28.

1. Install the **fan** to the slot and secure it with the following **screws**.
 - M2.5×6C Tapping screw ×2
2. Connect the **fan cable** to the connector **CN8771** on the system board and stick the **glass tape**.

4.20 System board

Removing the System board

To remove the system board, follow the steps below and refer to Figure 4-29.

1. Remove the **insulator** securing the HDD cable.
2. Remove the following **screws** and **system board**. Remove the small arrow portion in the figure below first.

- M2.5×6C Tapping screw ×2

CAUTION: When removing the system board, do not touch the PC card slot.

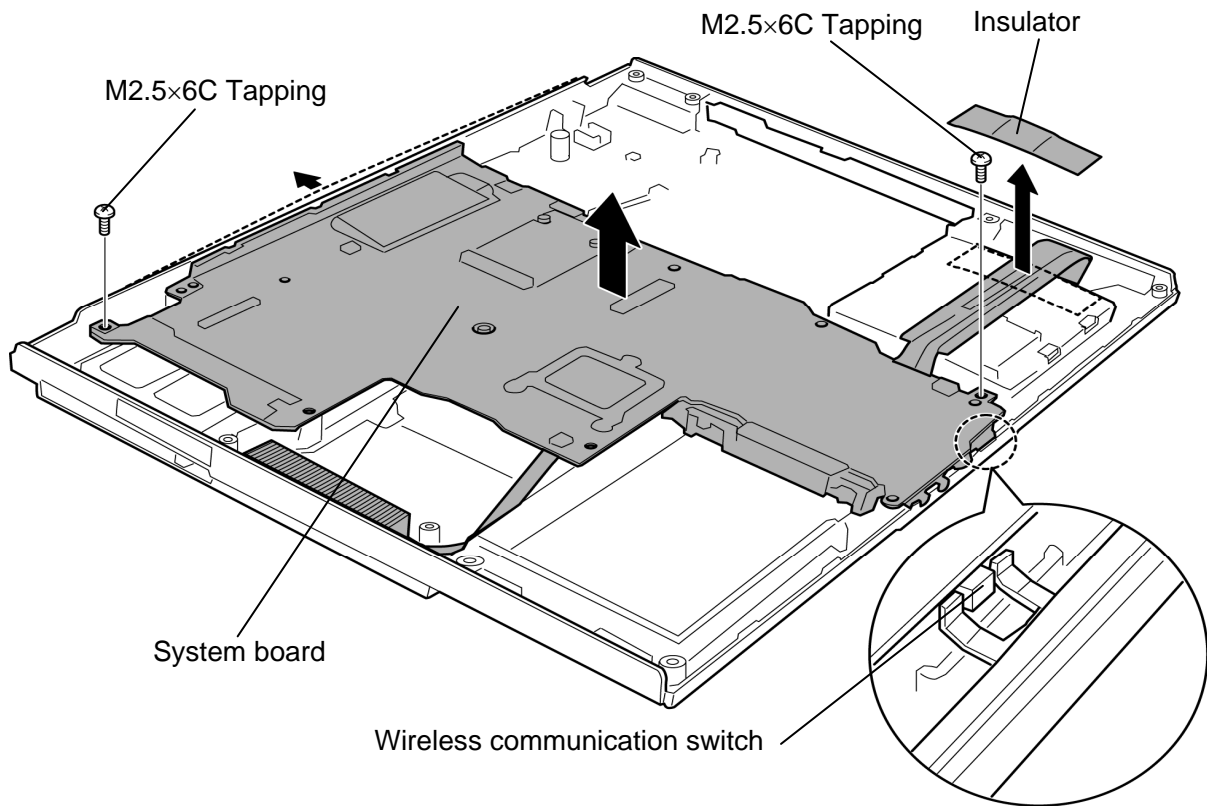


Figure 4-29 Removing the system board

Installing the System board

To install the system board, follow the steps below and refer to Figure 4-29.

1. Install the **system board** to the slot of the base assembly and secure it with the following **screws**. Install the small arrow portion in the figure 4-29 first.

- M2.5×6C Tapping screw ×2

CAUTION: *When installing the system board, make sure that the wireless communication switch is engaged to the guide.*

Tighten the screws before sticking the insulator.

2. Stick the **insulator** in place.

4.21 Battery lock

Removing the Battery lock

To remove the battery lock, follow the steps below and refer to Figure 4-30.

1. Remove the following **screw** securing the battery lock.
 - M2.5×6C Tapping screw ×1
2. Make the switch of the battery lock on the back of the base assembly locked and remove the **battery lock** while releasing **hooks**.

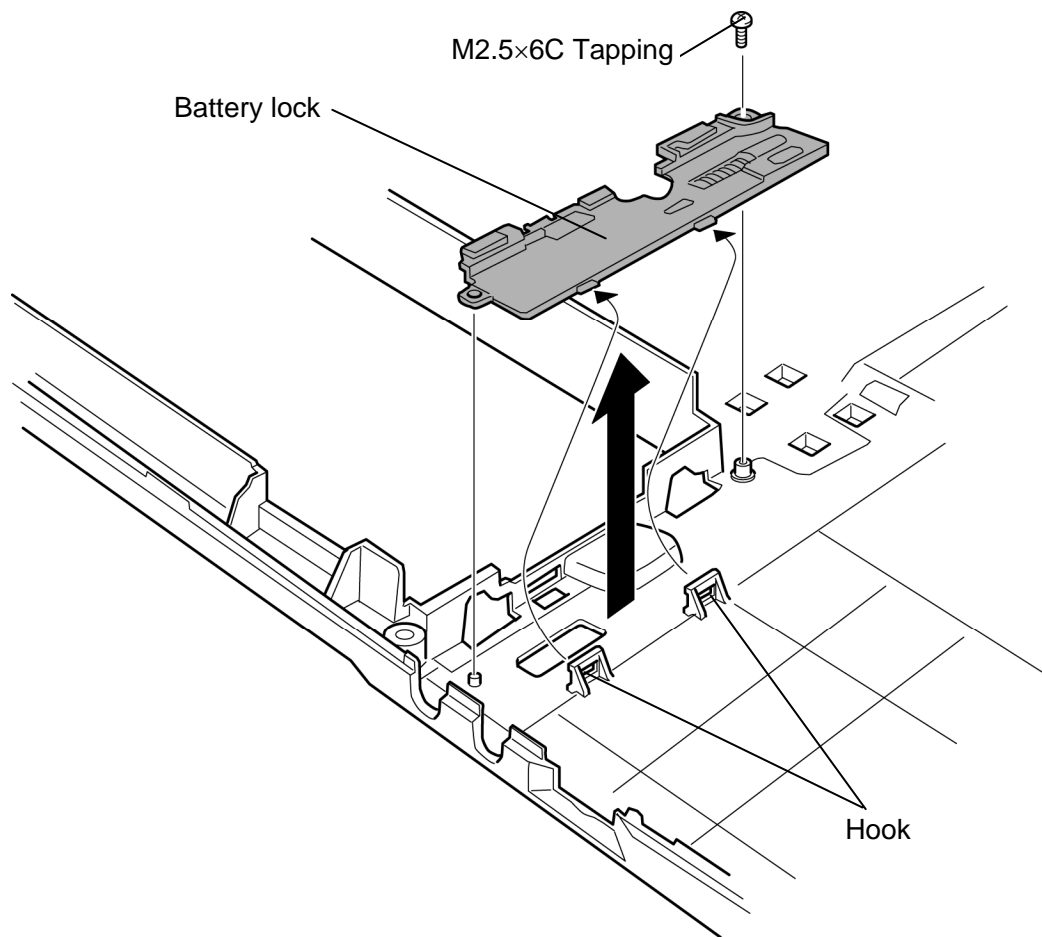


Figure 4-30 Removing the battery lock

Installing the Battery lock

To install the battery lock, follow the steps below and refer to Figure 4-30.

1. Install the **battery lock** to the base assembly and secure it with the following **screw**.
 - M2.5×6C Tapping screw ×1
2. Make the switch of the battery lock released.

4.22 HDD cable

To remove the HDD cable, follow the steps below and refer to Figure 4-31.

1. Peel off the **insulator** and disconnect the **HDD cable** from the connector **CN1850** on the system board.

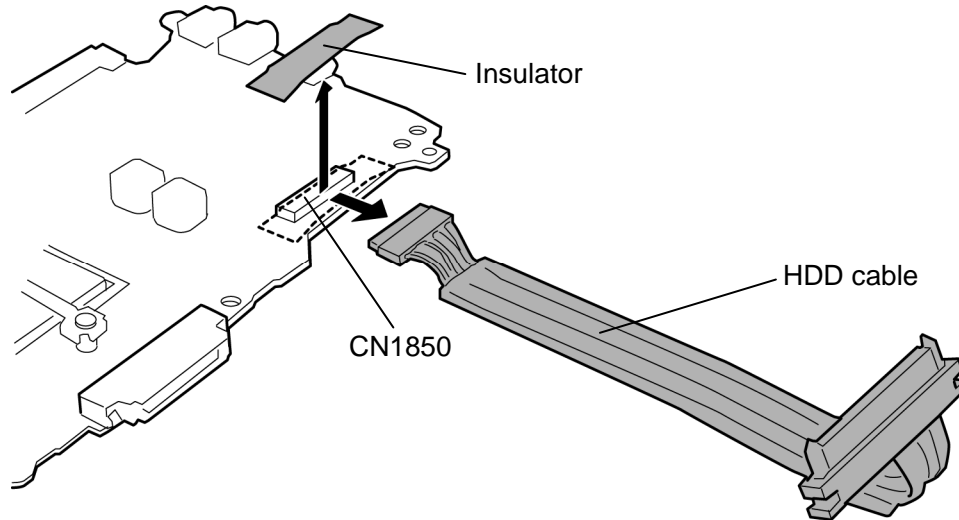


Figure 4-31 Removing the HDD cable

Installing the HDD cable

To install the HDD cable, follow the steps below and refer to Figure 4-31.

1. Connect the **HDD cable** to the connector **CN1850** on the system board and stick the **insulator**.

4.23 Heat sink/CPU

Removing the Heat sink/CPU

To remove the heat sink/CPU, follow the steps below and refer to Figure 4-32 and 4-33.

CAUTION: 1) The CPU can become very hot during operation. Be sure to let it cool before starting repair work.
2) When you remove the heat sink, wipe the grease off of the bottom of the heat sink and top of the CPU. Apply new grease when installing.

1. Remove the following **screws** securing the CPU holder in the opposite order of the marks (number) on the holder.
 - M2×4B BIND screw ×3
2. Remove the **CPU holder** and **heat sink**.

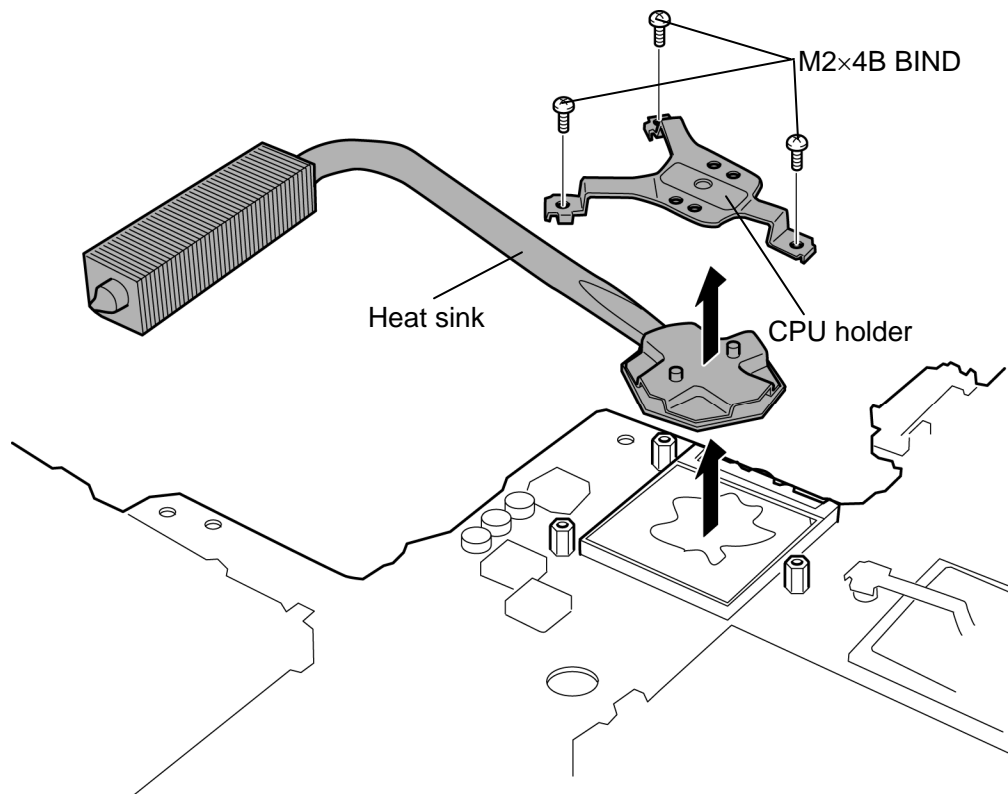


Figure 4-32 Removing the heat sink

3. Unlock the **CPU** by turning the **cam** counterclockwise on the CPU socket by 90 degrees with a flat-blade screwdriver.
4. Remove the **CPU**.

CAUTION: When removing the CPU, lift it up right above. Otherwise, pins of CPU may be damaged.

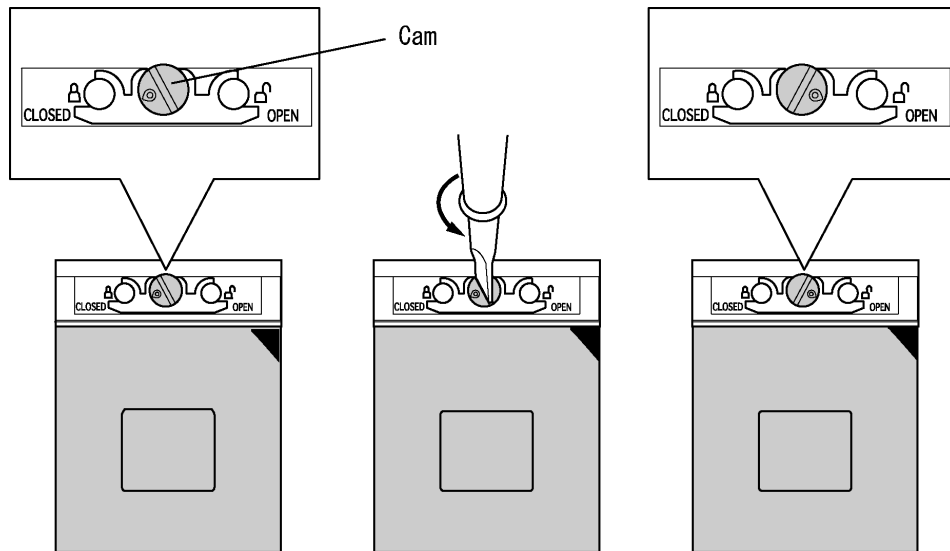


Figure 4-33 Removing the CPU

Installing the Fan/CPU

To install the fan/CPU, follow the steps below and refer to Figure 4-32 to 4-35.

1. Make sure the **cam** is in the open position.
2. Seat the **CPU** in the CPU socket. Make sure the direction and position of CPU is correct to avoid damaging pins on the CPU.

CAUTION: Place the CPU in such direction as shown below. (Pay attention to the position of the triangle mark on the CPU.)

3. Fix the **CPU** by turning the **cam** on the CPU socket by 90 degrees clockwise with a flat-blade screwdriver (in the order shown in the figure below).

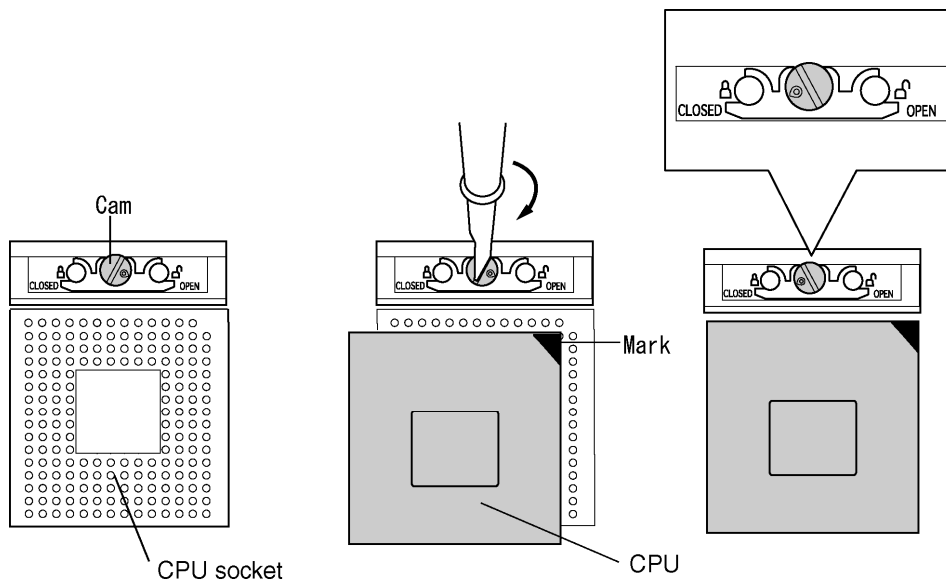


Figure 4-34 Installing the CPU

4. Apply new **grease** on the CPU using a special syringe as shown in the following figure. Apply quarter of scale (0.25ml) of grease evenly on the CPU chip. When silicon grease is already applied to the CPU, wipe them off with a close in advance.

CAUTION: When installing the CPU, apply new grease on the top of the CPU chip.
When installing the fin, make sure the bottom of the fin covers the top of the CPU.

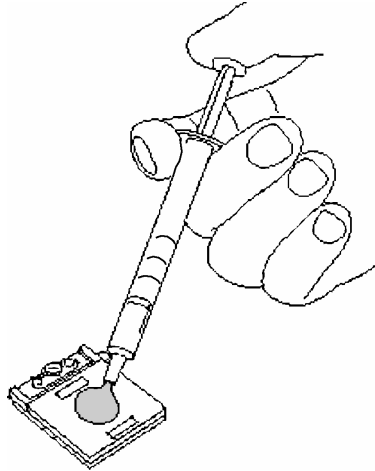


Figure 4-35 Applying new grease

5. Seat the **CPU heat sink** in place.
6. Install the **CPU holder** and secure it with the following **screws** in the order of the number marked on the holder.
 - M2×4B BIND screw ×3

CAUTION: Tighten the screws in the order of mark “1”, “2” and “3” on the CPU holder.

4.24 PC card slot

Removing the PC card slot

To remove the PC card slot, follow the steps below and refer to Figure 4-36.

1. Remove the following **screws** securing the PC card slot.
 - M2×3C S-THIN HEAD screw ×2
 - M2×8C S-THIN HEAD screw ×2
2. Remove the **PC card slot** while releasing latches.

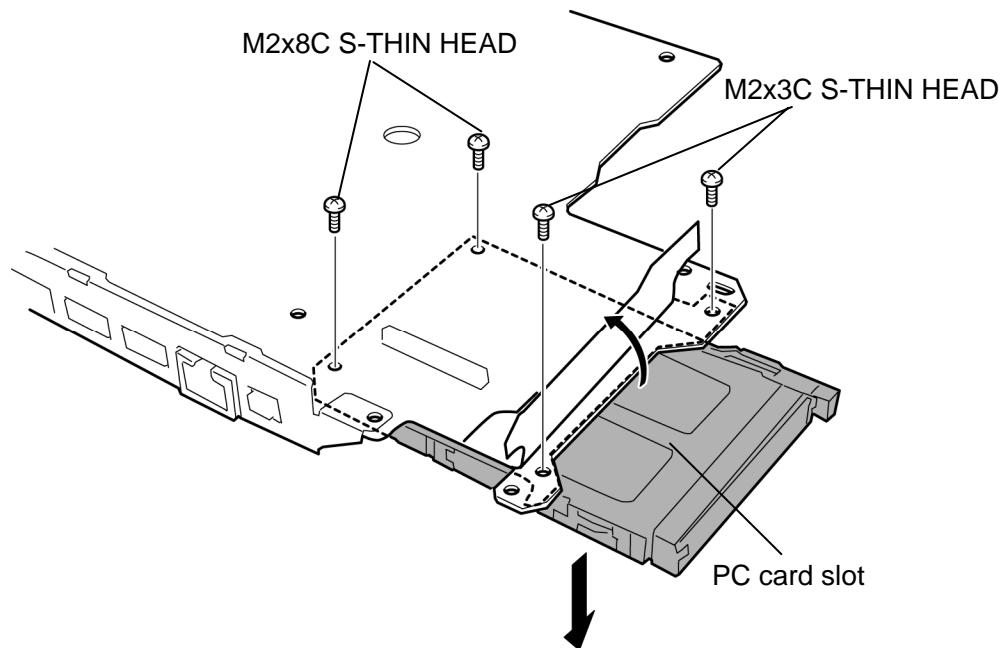


Figure 4-36 Removing the PC card slot

Installing the PC card slot

To install the PC card slot, follow the steps below and refer to Figure 4-36.

1. Install the **PC card slot** and secure it with the following **screws**.
 - M2×3C S-THIN HEAD screw ×2
 - M2×8C S-THIN HEAD screw ×2

4.25 LCD unit/FL inverter

Removing the LCD unit/FL inverter

To remove the LCD unit/FL inverter, follow the steps below and refer to Figure 4-37 to 4-40.

1. Open the display and make it flat.
2. Remove the keyboard cover while releasing latches. (In the case of removing LCD before the keyboard)
3. Remove the **mask seals** and following **screws** securing the LCD mask.
 - M2.5×6B FLAT HEAD screw ×2
4. Remove the **LCD mask** while releasing the latches.

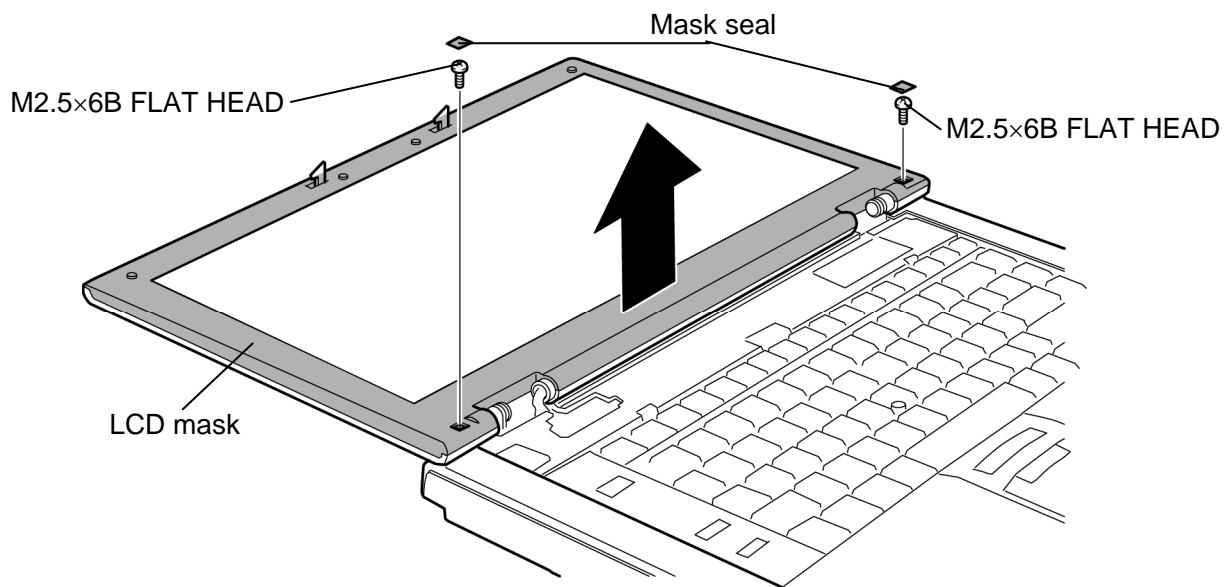


Figure 4-37 Removing the LCD mask

5. Pull out the **insulator** under the LCD.
6. Remove the **FL inverter** while peeling off the double-sided tape.
7. Disconnect the **cables** from both the sides of FL inverter.

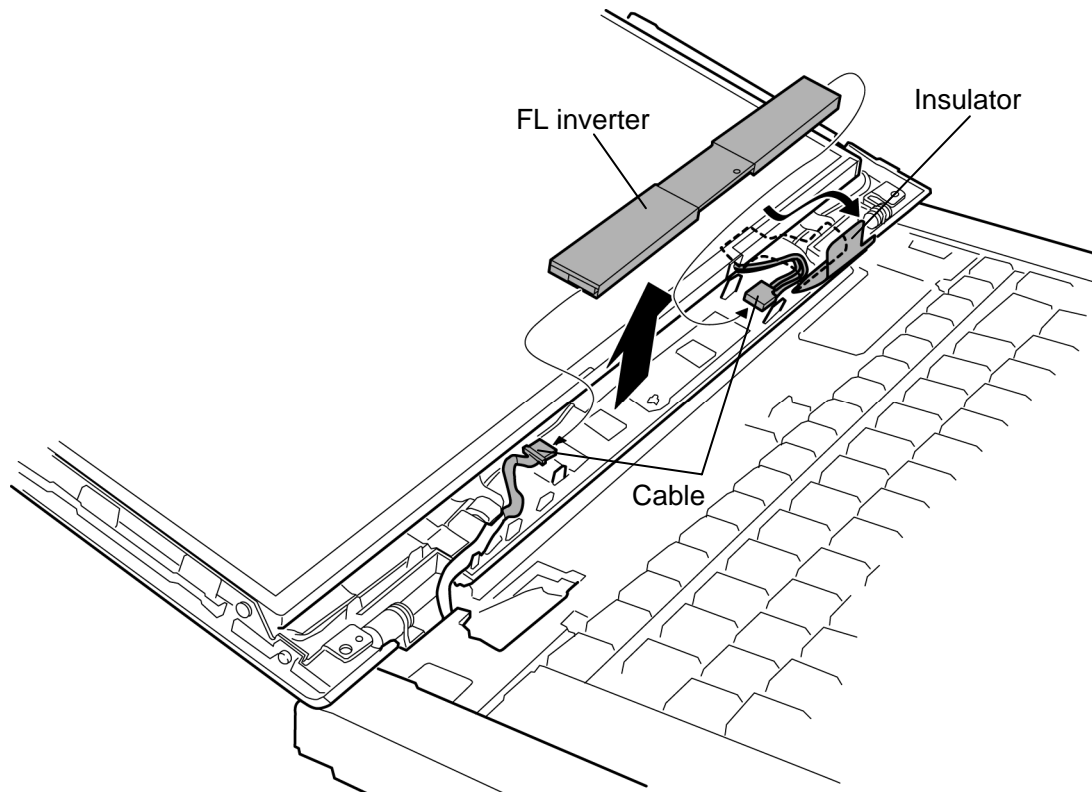


Figure 4-38 Removing the FL inverter

8. Disconnect the **LCD cable** from the connector **CN5000** on the system board. (When the cover assembly is removed first, the LCD cable is already disconnected.)
9. Remove the following **screws** and **LCD unit**.
 - M2×3C BIND screw ×4

CAUTION: When lifting up the top of the LCD unit, hold the corners of the LCD unit. The top edge of LCD unit is sensitive area.

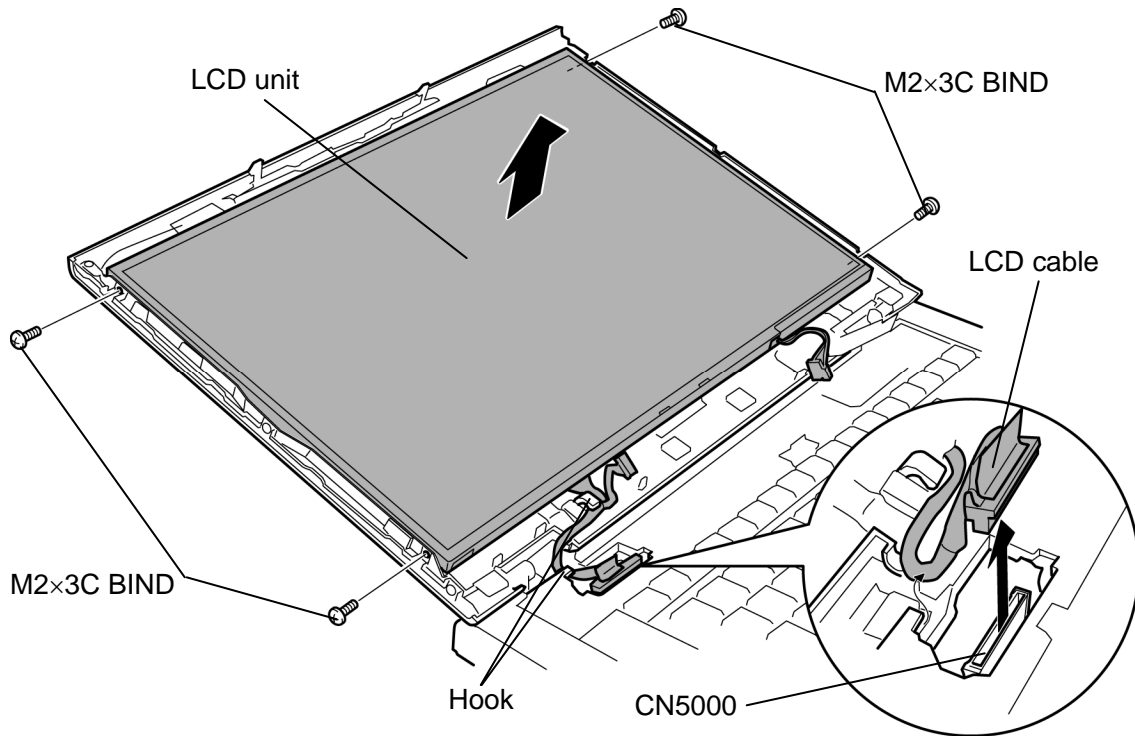


Figure 4-39 Removing the LCD unit

10. Remove two **glass tapes** securing the LCD cable and disconnect the **LCD cable** from the connector on the LCD unit.

CAUTION: When removing the LCD cable, be careful not to damage the connector.

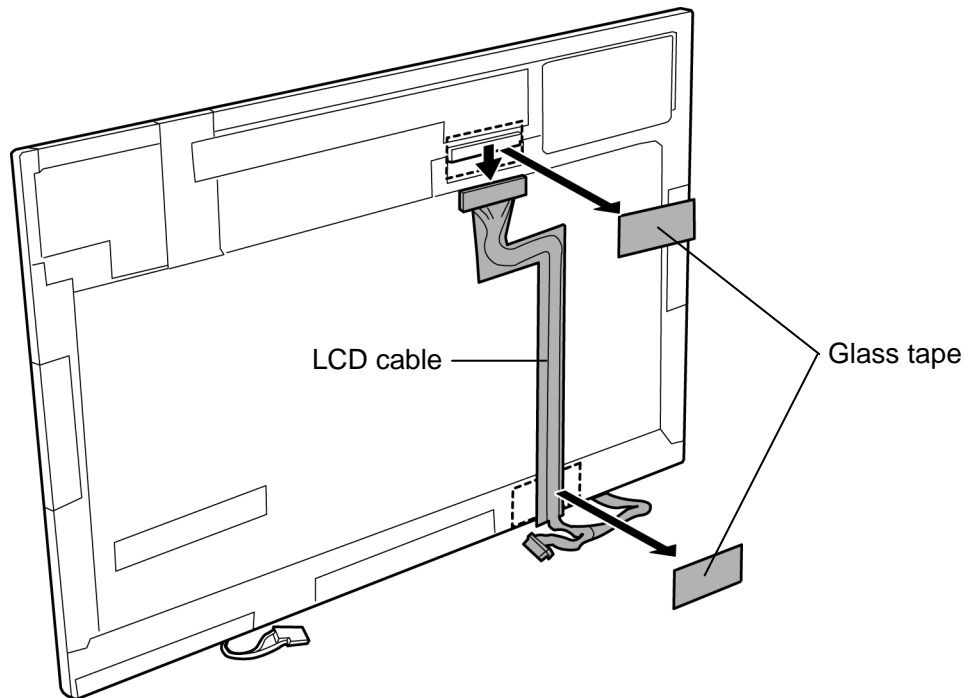


Figure 4-40 Removing the LCD cable

Installing the LCD unit/FL inverter

To install the LCD unit/FL inverter, follow the steps below and refer to Figure 4-37 to 4-40.

1. Connect the **LCD cable** to the connector on the back of the LCD unit. Stick two **glass tapes** in place.
2. Install the **LCD unit** to the display cover and secure it with the following **screws**.
 - M2×3C BIND screw ×4
3. Arrange the LCD cable through the **hook** and connect the **LCD cable** to the connector **CN5000** on the system board.
4. Connect two **cables** to the FL inverter and install the **FL inverter** in place.
5. Insert the **insulator** under the LCD unit.
6. Install the **LCD mask** while engaging the latches.
7. Secure the LCD mask with the following **screws** and stick the **mask seals**.
 - M2.5×6B FLAT HEAD screw ×2
8. Install the **keyboard cover** while engaging latches.

4.26 Cover latch

Removing the Cover latch

To remove the cover latch, follow the steps below and refer to Figure 4-41.

1. Remove the **latch knob** while pushing three hooks.
2. Remove the **latch hook**. Be careful not lose the **spring**.

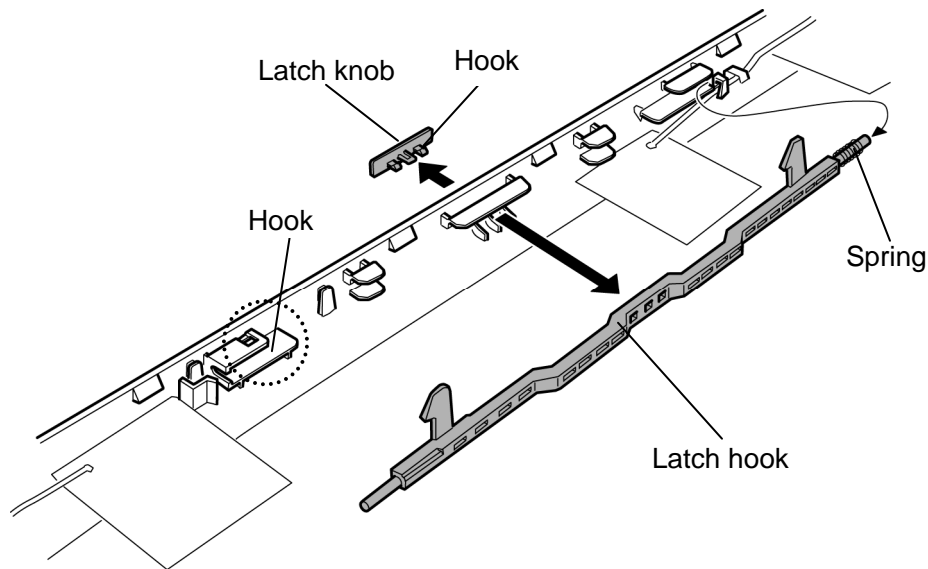


Figure 4-41 Removing the cover latch

Installing the Cover latch

To install the cover latch, follow the steps below and refer to Figure 4-41.

1. Install the **latch hook** while engaging it to the **hook**.
2. Set the **latch knob** and push it until the hooks are engaged.

4.27 Display rear cover

Removing the Display rear cover

To remove the display rear cover, follow the steps below and refer to Figure 4-42.

1. Remove the following screws.
 - M2.5×6C Tapping screw ×2
 - M2.5×4B FLAT HEAD screw ×4
2. Pass the **wireless LAN antenna cables** and **Bluetooth antenna cable** through the hole of the cover assembly and separate the **display rear cover** and **cover assembly**.

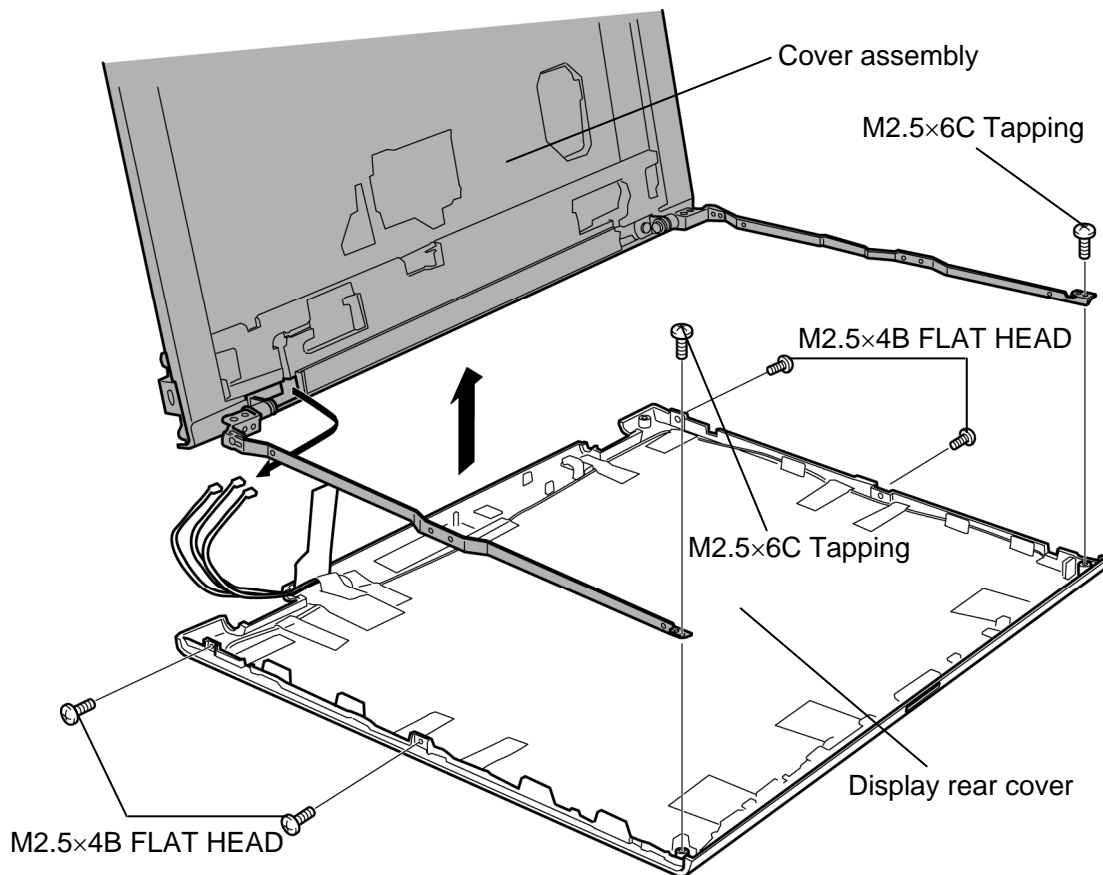


Figure 4-42 Removing the display rear cover

Installing the Display rear cover

To install the display rear cover, follow the steps below and refer to Figure 4-42.

1. Install the **cover assembly** to the **display rear cover** and secure them with the following **screws**.

- M2.5×6C Tapping screw ×2
- M2.5×4B FLAT HEAD screw ×4

CAUTION: *When tightening the M2.5×4B FLAT HEAD screws, apply loctite to the tip of the screws.*

2. Arrange the **wireless LAN antenna cables** and **Bluetooth antenna cable** while passing through the hole of the cover assembly.

4.28 Wireless LAN antenna/Bluetooth antenna

Removing the Wireless LAN antenna/Bluetooth antenna

To remove the wireless LAN antenna/Bluetooth antenna, follow the steps below and refer to Figure 4-43.

1. Peel off the **insulators** and **acetate tapes** securing the wireless LAN antenna cables and Bluetooth antenna cable.
2. Remove the **wireless LAN antennas** and **Bluetooth antenna** from the slot of the display rear cover.

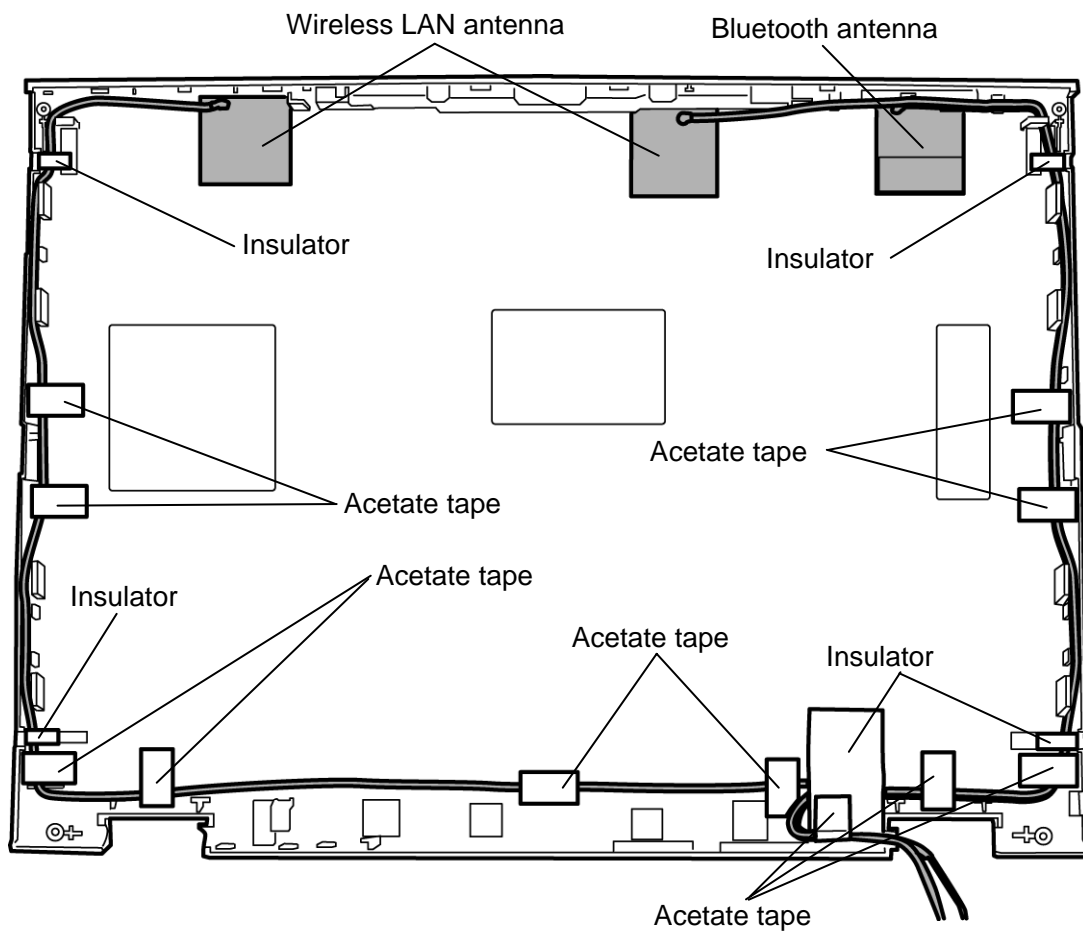
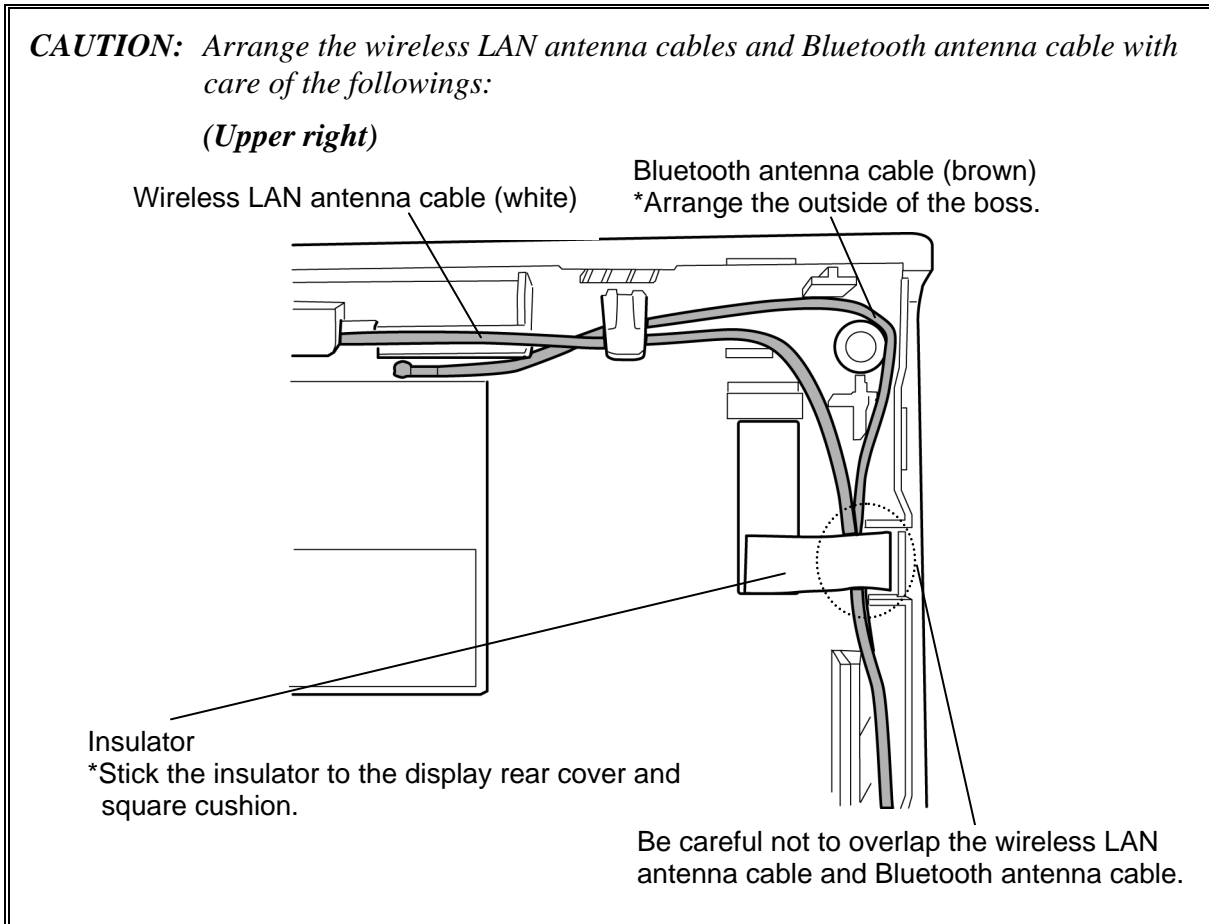


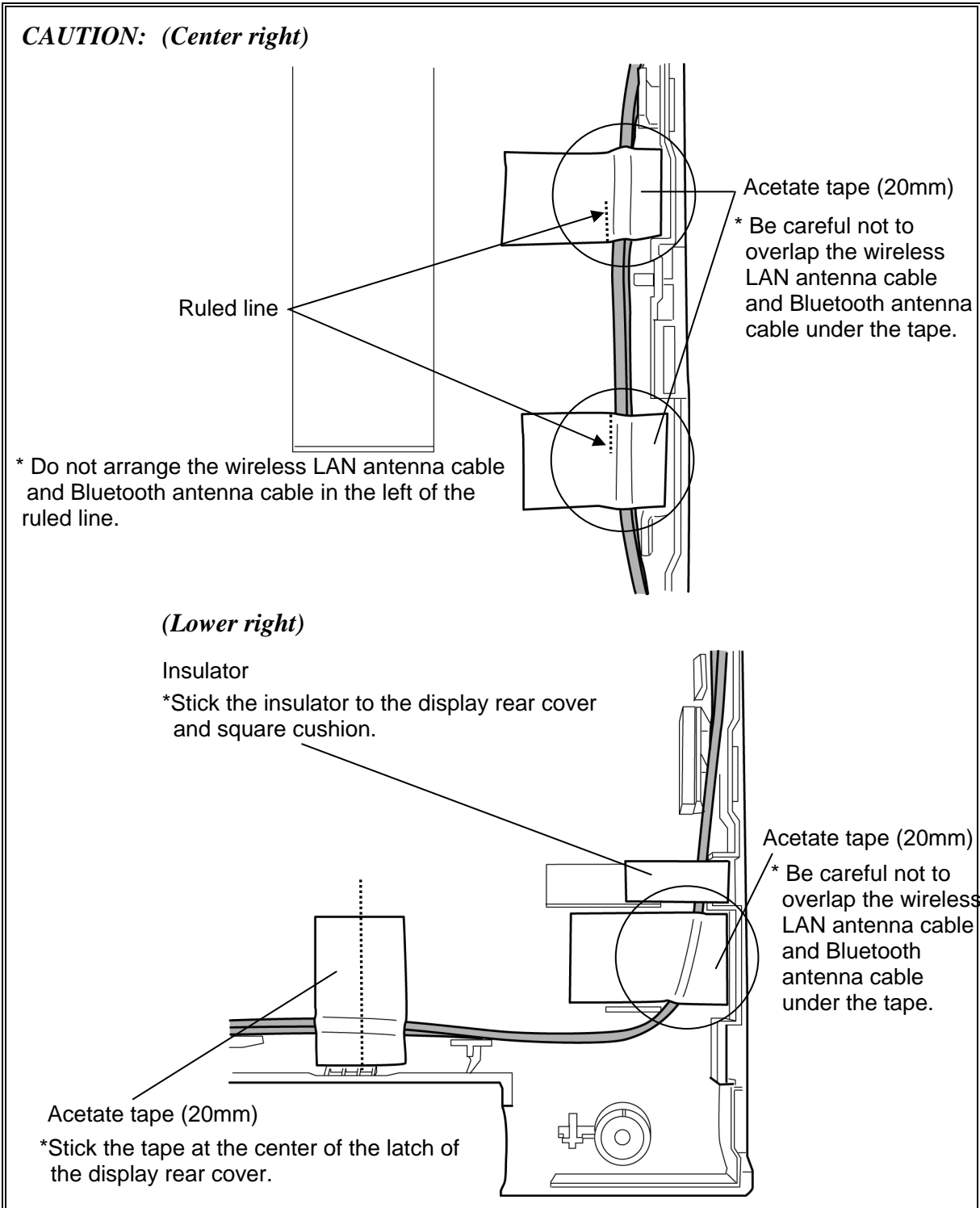
Figure 4-43 Removing the wireless LAN antenna/Bluetooth antenna

Installing the Wireless LAN antenna/Bluetooth antenna

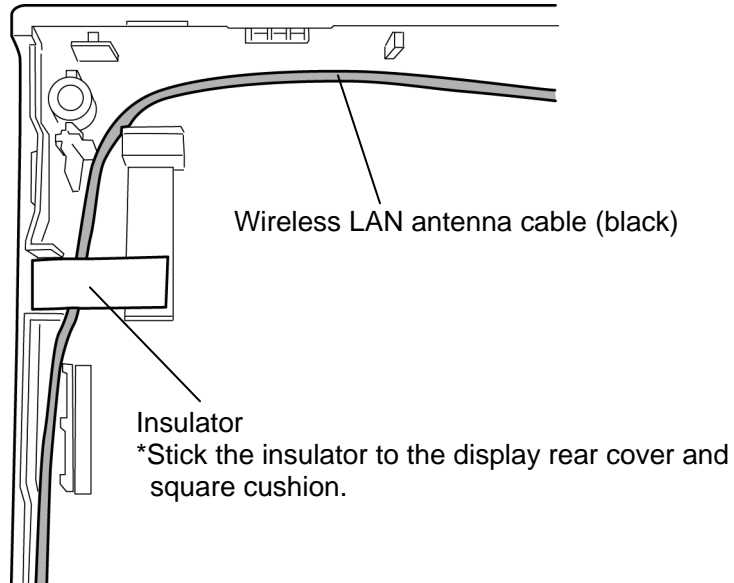
To install the wireless LAN antenna/Bluetooth antenna, follow the steps below and refer to Figure 4-43.

1. Install the **wireless LAN antennas** and **Bluetooth antenna** to the display cover.
2. Arrange the **wireless LAN antenna cables** and **Bluetooth antenna cable** on the display rear cover and secure it with the **insulators** and **acetate tapes**.

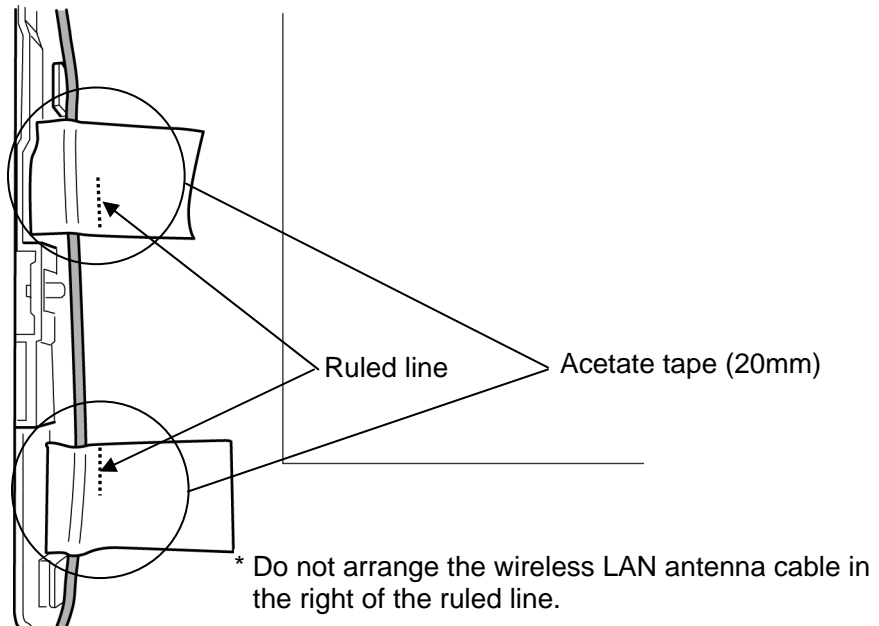




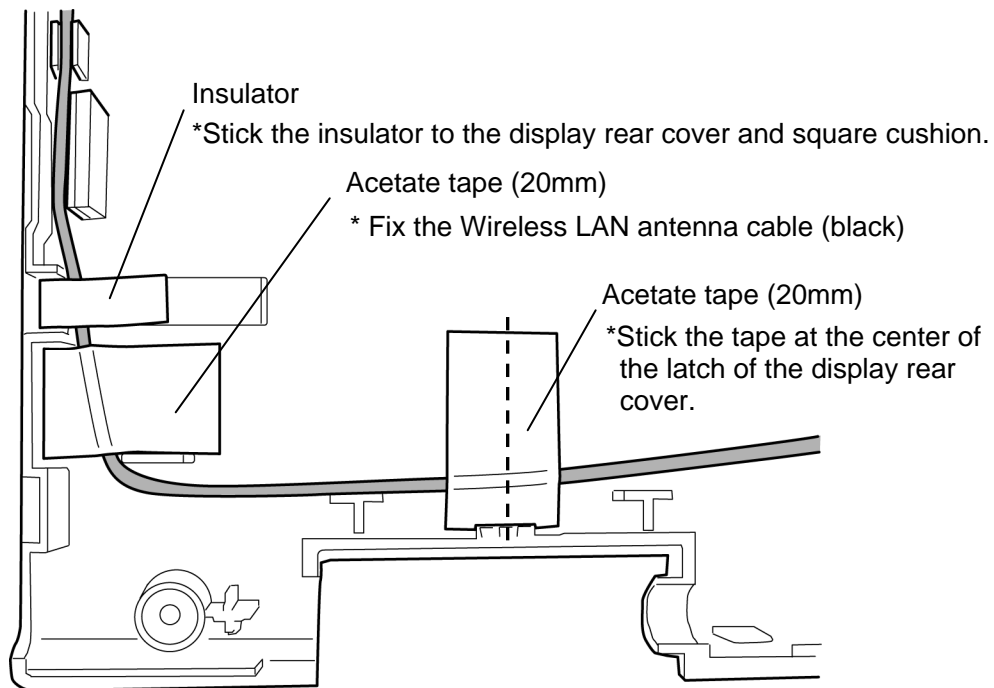
CAUTION: (Upper left)



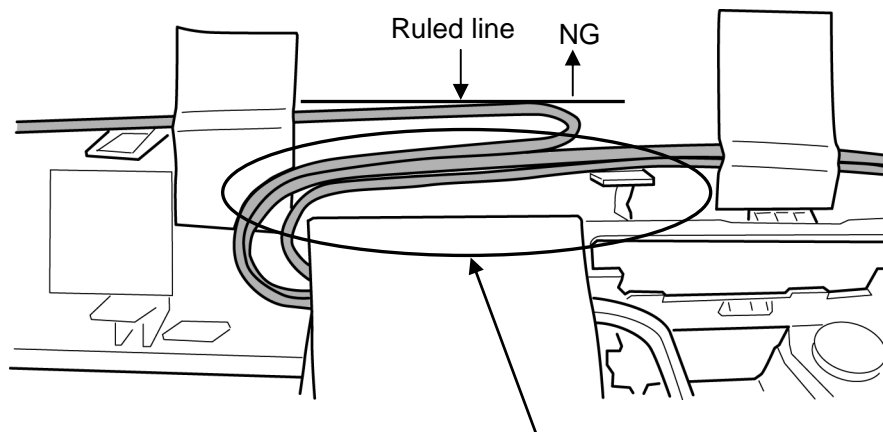
(Center left)



CAUTION: (Lower left)



(Hinge portion (before sticking insulator))

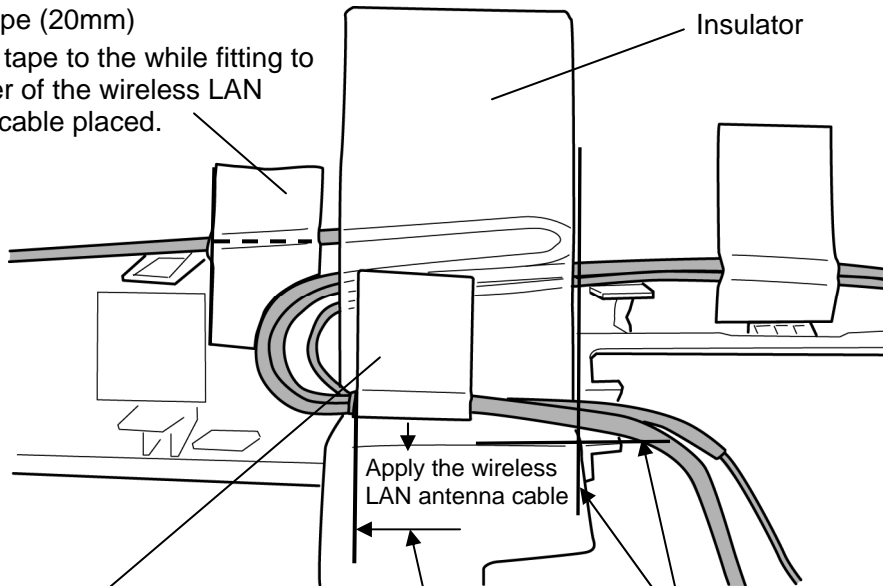


- * Be careful not to overlap the wireless LAN antenna cable and Bluetooth antenna cable.
- * Do not arrange the wireless LAN antenna cable and Bluetooth antenna cable in the upper side of the ruled line.

CAUTION: (Hinge portion (after sticking insulator))

Acetate tape (20mm)

- * Stick the tape to the while fitting to the center of the wireless LAN antenna cable placed.



Acetate tape (30mm)

- * Stick the tape while wrapping once to the wireless LAN antenna cable.

- * Arrange the Bluetooth antenna cable under the wireless LAN antenna cable.

- * Aline the edge of the thermo-fit tube with the right edge of the "T" form rib.

4.29 Hinge

Removing the Hinge

To remove the hinge, follow the steps below and refer to Figure 4-44.

1. Remove the following **screw** securing the left hinge. (Front of the cover assembly)
 - M2.5×4B FLAT HEAD screw ×1
2. Turn over the cover assembly and remove the following **screw** and **left hinge**.
 - M2.5×6C Tapping screw ×1
3. Remove the following **screw** and **right hinge** while releasing two **hooks**.
 - M2.5×6C Tapping screw ×1

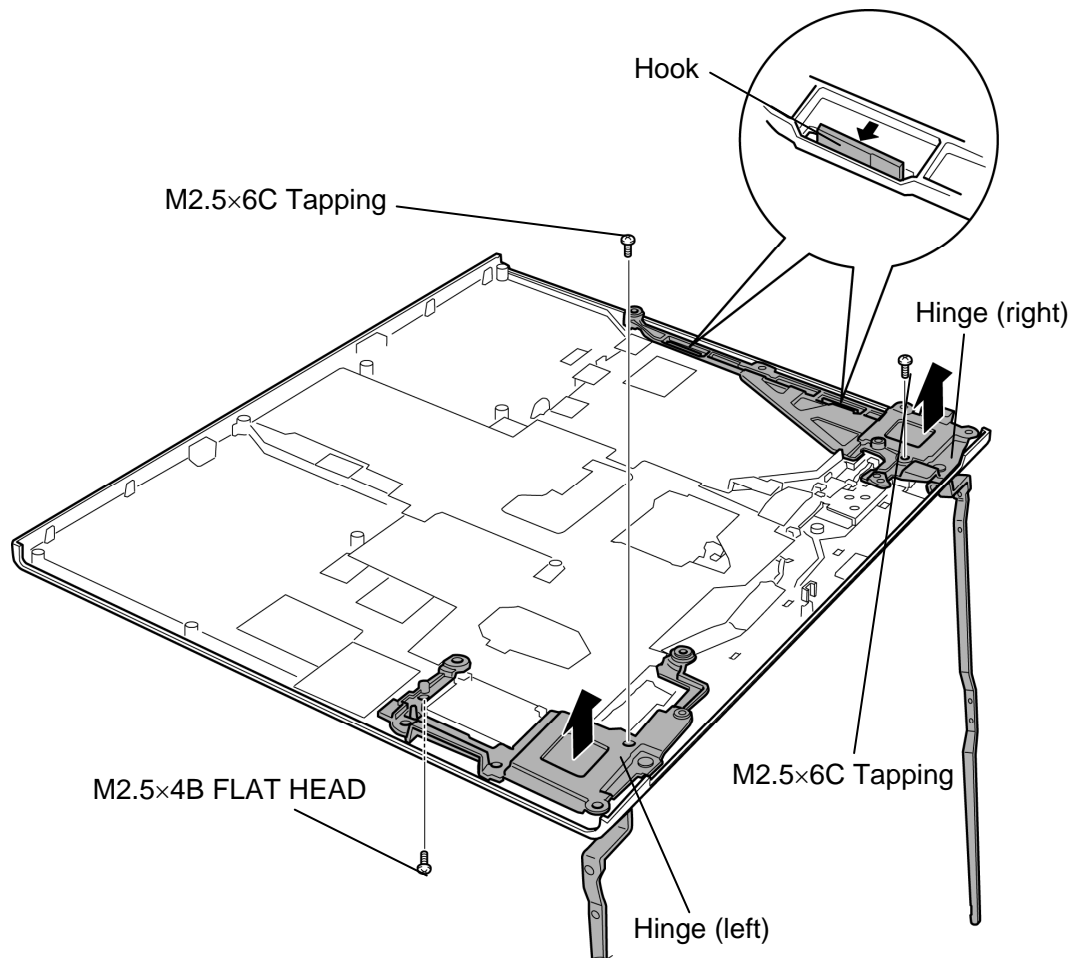


Figure 4-44 Removing the hinge

Installing the Hinge

To install the hinge, follow the steps below and refer to Figure 4-44.

1. Install the right **hinge** while engaging two **hooks** and secure it with the following **screw**.
 - M2.5×6C Tapping screw ×1
2. Install the left **hinge** and secure it with the following **screw**.
 - M2.5×6C Tapping screw ×1
3. Turn the cover assembly face up and secure the left hinge with the following **screw**.
 - M2.5×4B FLAT HEAD screw ×1

4.30 Speaker

Removing the Speaker

To remove the speaker, follow the steps below and refer to Figure 4-45 and 4-46.

1. Turn up two **insulators** and peel off two **acetate tapes**.
2. Remove the **speakers** from the slots.

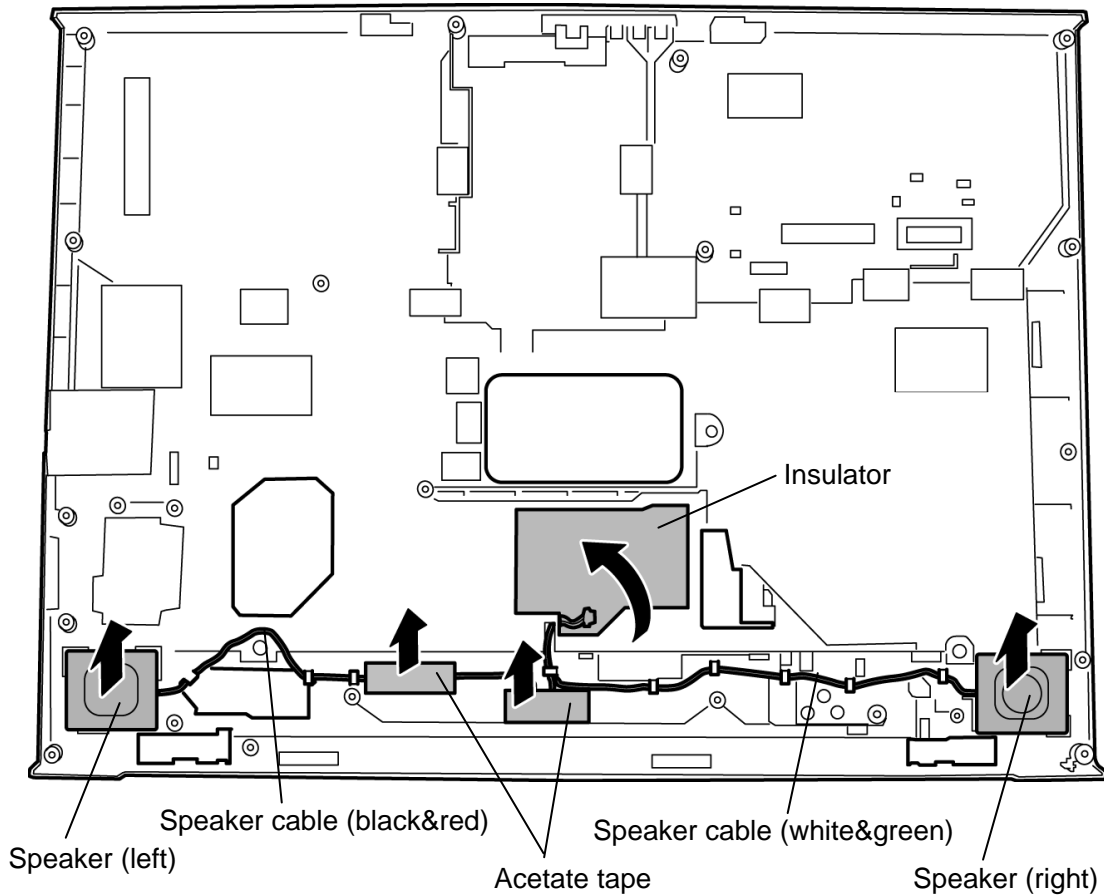


Figure 4-45 Removing the speaker (1)

3. Separate the **speakers** (left and right) and **speaker covers** (left and right).

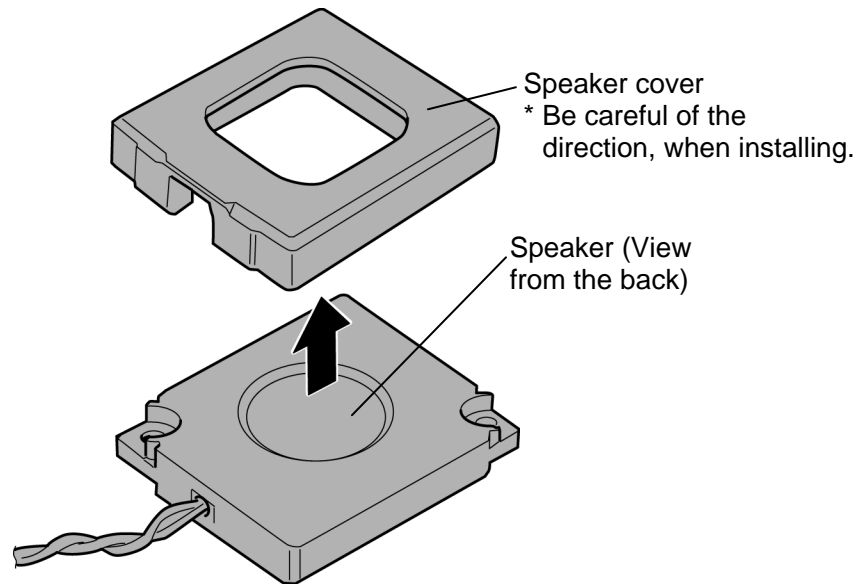


Figure 4-46 Removing the speaker (2)

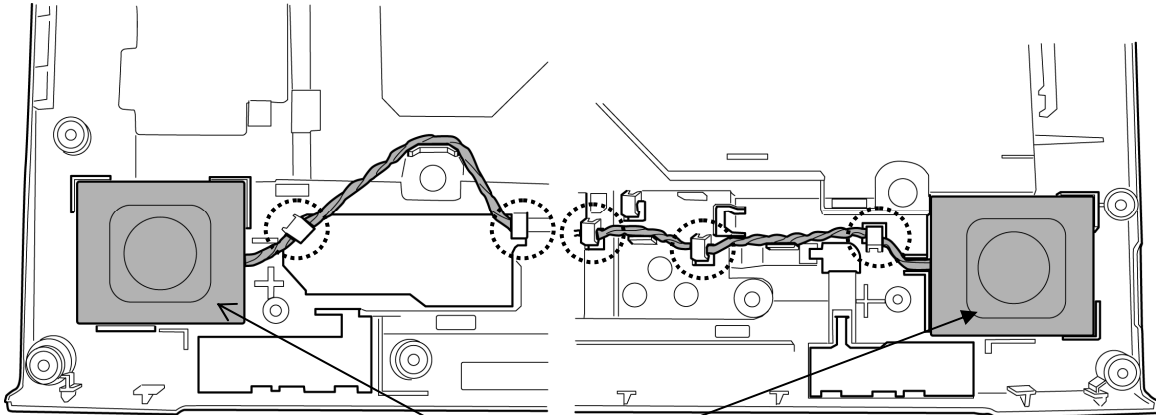
Installing the Speaker

To install the speaker, follow the steps below and refer to Figure 4-45 and 4-46.

1. Install the **speakers** (left and right) to the **speaker covers** (left and right).
2. Install the **speakers** (left and right) to the slots (left and right).
3. Turn up the **insulator** and arrange the **speaker cables**.
4. Stick two **acetate tapes** in place.

CAUTION: When installing the speaker and arrange the speaker cables, be careful of the followings.

(Installing the speaker)

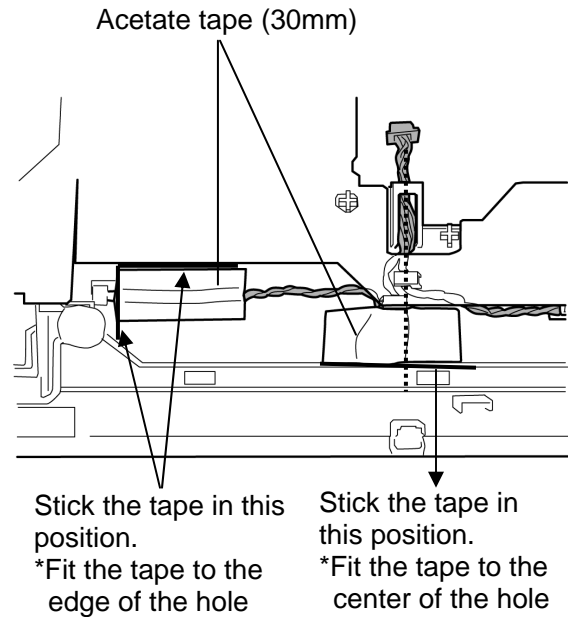
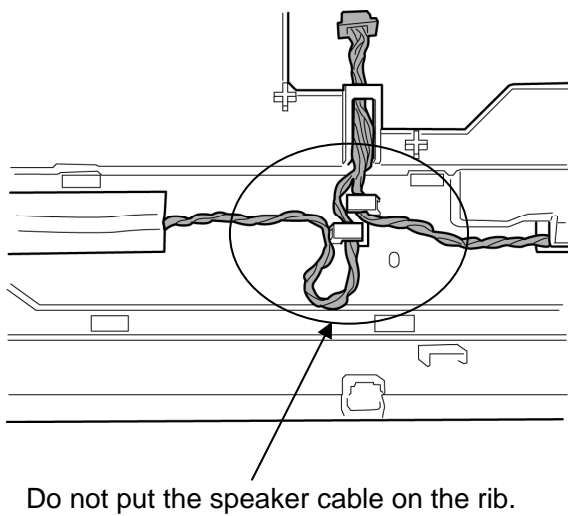
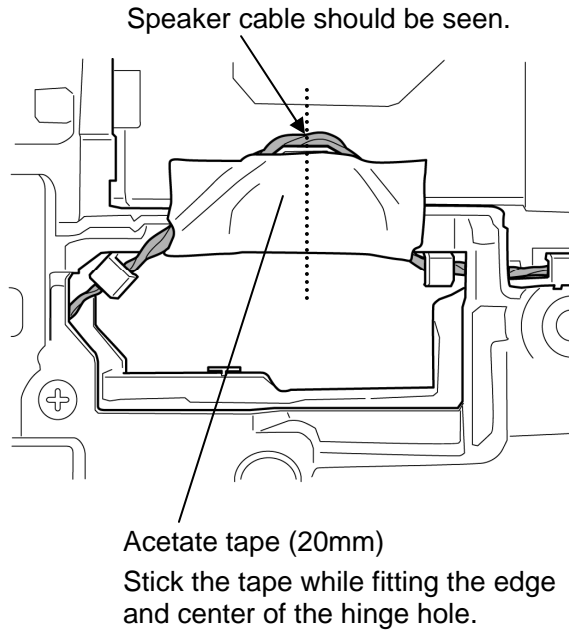
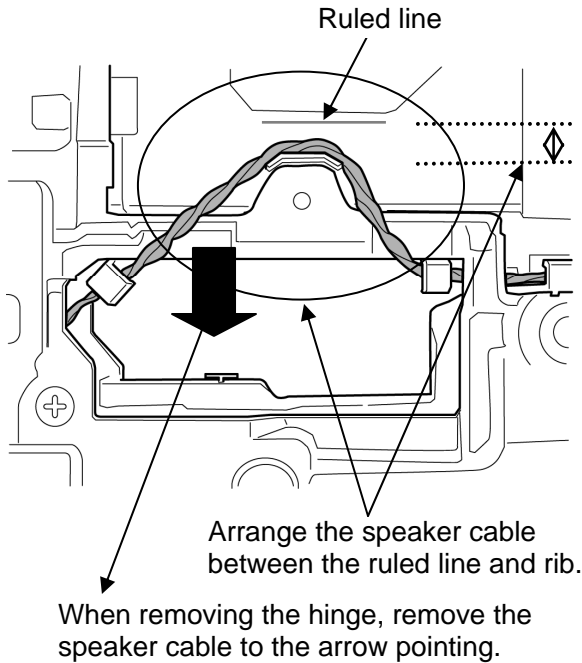


* Be careful the direction of the speakers.

* Make sure that the speaker cable pass under the guides (⊙) in the figure above.

CAUTION: When installing the speaker and arrange the speaker cables, be careful of the followings.

(Arranging the speaker cable (left side))



4.31 Fluorescent Lamp

This system uses LCD modules from the following suppliers. The procedure for replacing the fluorescent lamp is different for each LCD module. Refer to the appropriate procedure.

Type	Part No.	Supplier	Section
15.4-inch (WXGA)	G33C0003E110	LG Philips	4.31.1
	G33C0003G110		
	G33C0003F110	SAMSUNG	4.31.2
	G33C0003H110		

- NOTE:**
- When working with a LCD module, always use a flat, grounded table.
 - Handle the backlight unit in the environment without dust, such as on the clean bench. Keep the worktable free from any screws or other material that may scratch the LCD surface.
 - Use an anti-static or protective sheet.
 - When replacing the FL unit, cover with a finger protector or similar to prevent soiling or scratching the LCD panel.
 - Be careful when handling the lamp. Excessive force may break the lamp.
 - Be careful not to soil or deform the lamp reflector.
 - Make sure that the power of the LCD module is turned off before connecting or disconnecting cables and connectors.

4.31.1 Replacing the 15.4-inch WXGA LG Philips Fluorescent Lamp

CAUTION: When replacing the fluorescent lamp, wear finger covers or gloves to avoid contaminating or damaging the LCD panel. Be careful not to let dust or other foreign substance into the module.

To replace the 15.4-inch WXGA LG Philips fluorescent lamp, follow the steps below and refer to Figure 4-47 to 4-54.

Disassembly of outside tape / Cover shield

1. Disassembly of Cover shield (S).

CAUTION: Pressure or stress should not be given on Source PCB.
Usage of gloves with anti-electric discharge coating is recommended.
To eliminate possible damage on circuits occurred by ESC.

2. Disassembly of Cover shield (G).

CAUTION: Pressure or stress should not be given on Gate COF.

3. Disassembly of Tape Adhesive used for Top case fixing.
4. Disassembly of Tape Adhesive used for B/L Wire fixing.

CAUTION: Pressure or stress should not be given on Top case during this process.

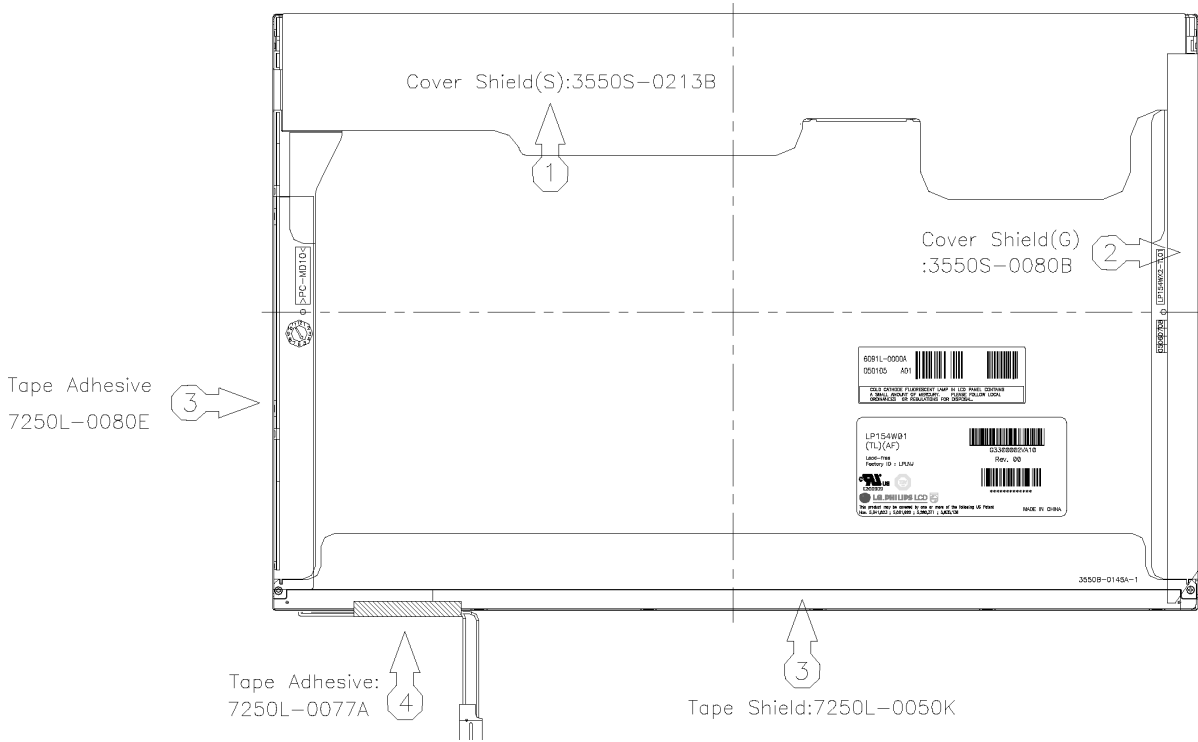


Figure 4-47 Replacing LG.Philips fluorescent lamp (WXGA) (1)

Disassembly of Top Case

1. Disassembly of Top Case.

CAUTION: Pressure or stress should not be given on Source TCP and Gate COF.

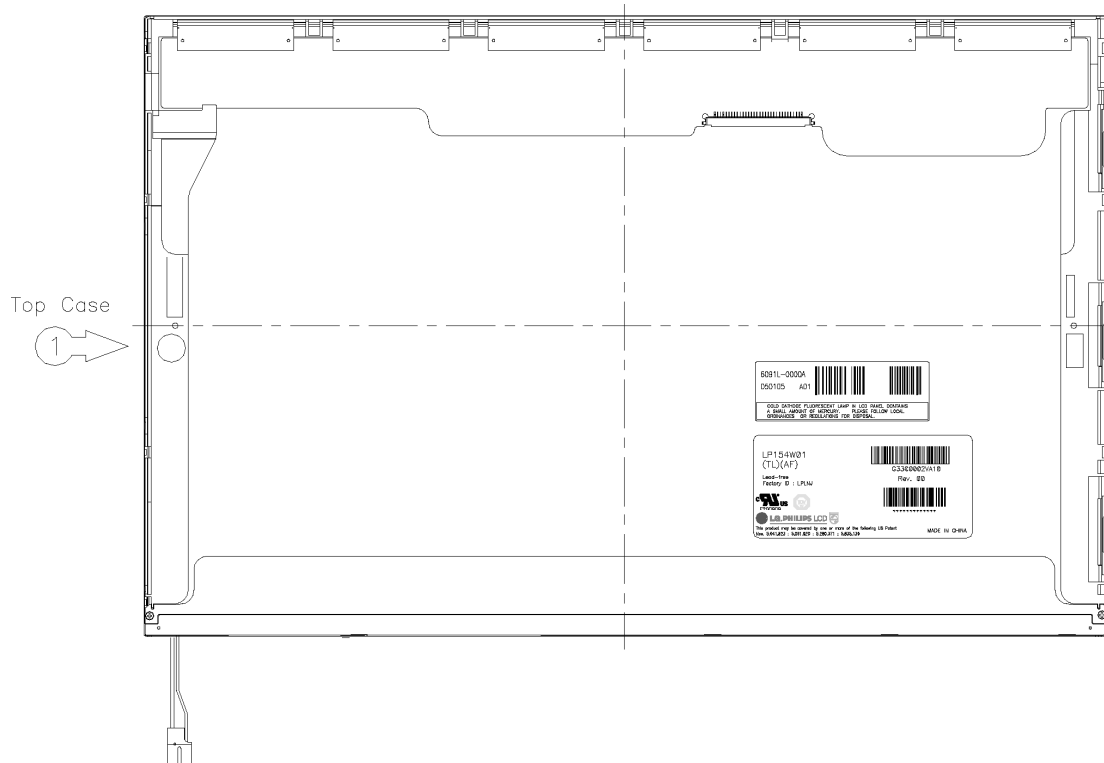


Figure 4-48 Replacing LG.Philips fluorescent lamp (WXGA) (2)

Disassembly of Source PCB

1. Disassembly of Source PCB.

CAUTION: Pressure or stress should not be given on PCB and TCP.

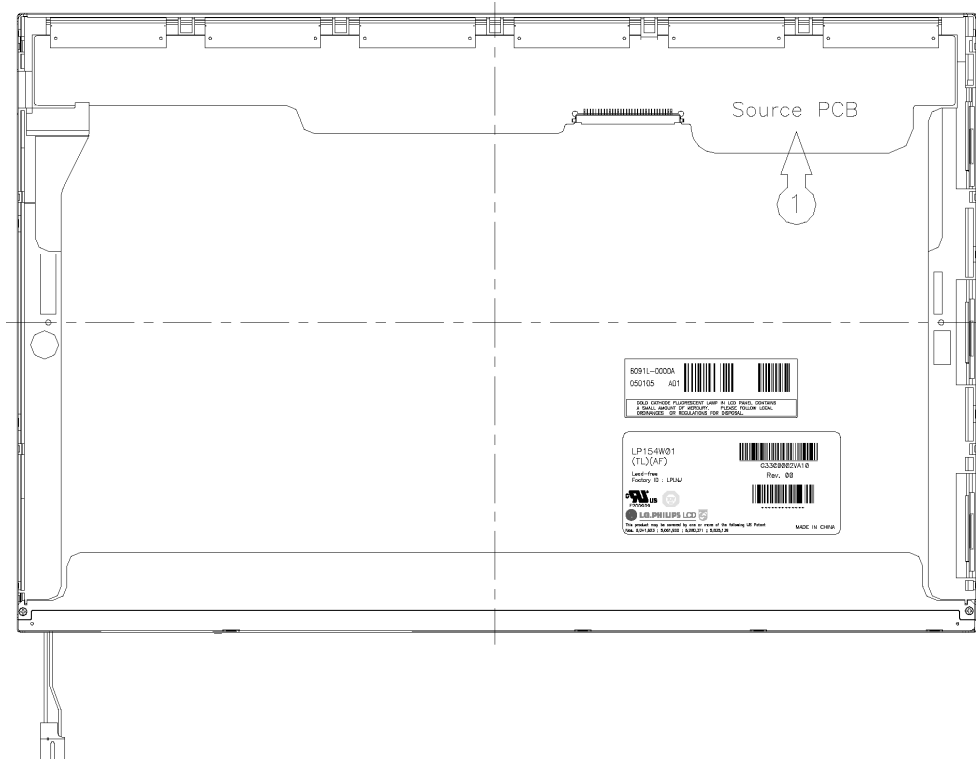


Figure 4-49 Replacing LG.Philips fluorescent lamp (WXGA) (3)

Disassembly of Case top, Board Ass'y, Tape Adhesive, Light guide, Cover Ass'y Bottom

1. Disassembly of Case top.
2. Disassembly of Board Ass'y.

CAUTION: This process should be made in Clean room with no scratch nor particle on Polarizer and B/L Ass'y.

3. Disassembly of Tape Adhesive used for Sheets fixing (4 Points).
4. Disassembly of Sheets and Light guide.

CAUTION: No penetration of foreign body is indispensable with no scratch on the surface of each Sheet.

5. Disassembly of Screw (2 Points) and Cover Ass'y.

CAUTION: Maximum value of torque with Screw should be below 1.5kg.

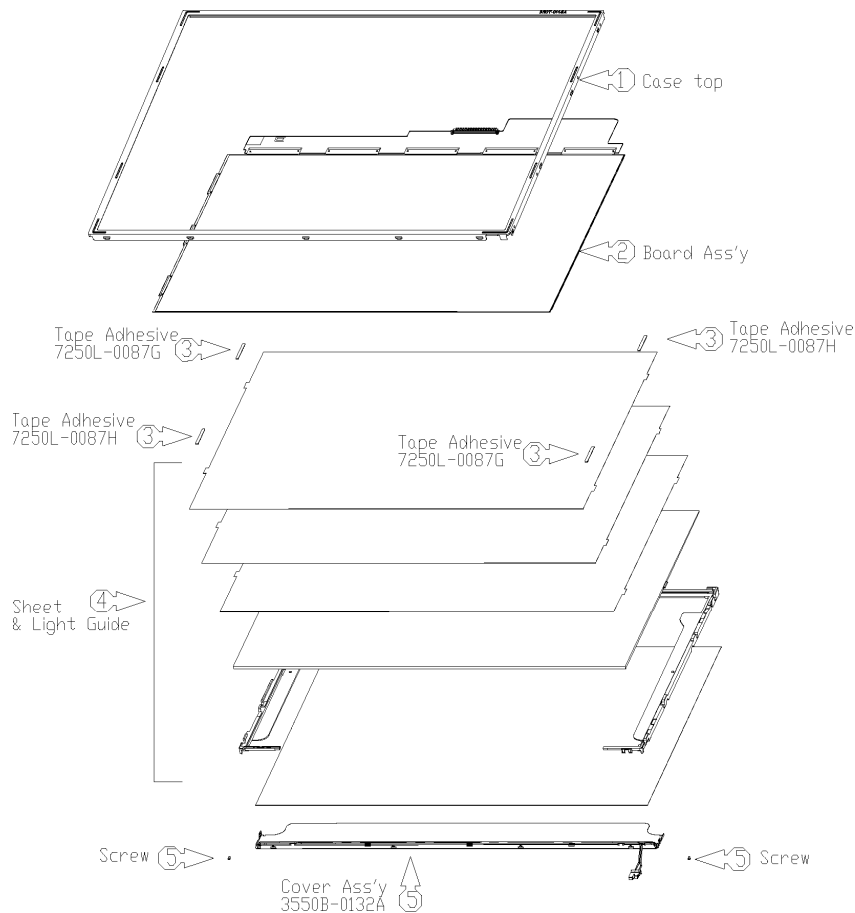


Figure 4-50 Replacing LG.Philips fluorescent lamp (WXGA) (4)

Assembly of Cover Ass'y, Sheets, Light guide, Tape Adhesive, Board Ass'y and Case top.

1. Assembly of Cover Ass'y and Screw (2 Points).

CAUTION: Maximum value of torque with Screw should be below 2.0kgf.cm.

2. Assembly of Light Guide and Sheets. (Reflector Sheet fixing with one Double Tape.)

CAUTION: No penetration of foreign body is indispensable with no scratch on the surface of each Sheet and Light guide.

3. Assembly of Tape adhesive used for Sheets fixing (4 Points).
4. Assembly of Board Ass'y.

CAUTION: Pressure or stress should not be given on PCB and COF.

5. Assembly of Case top.

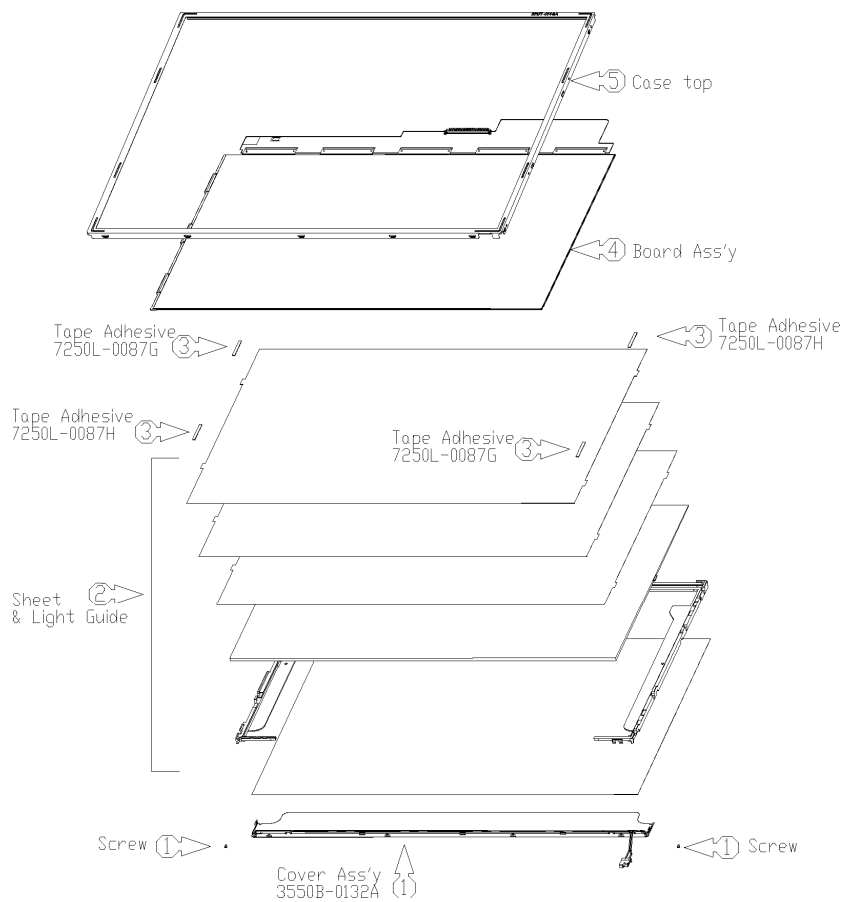
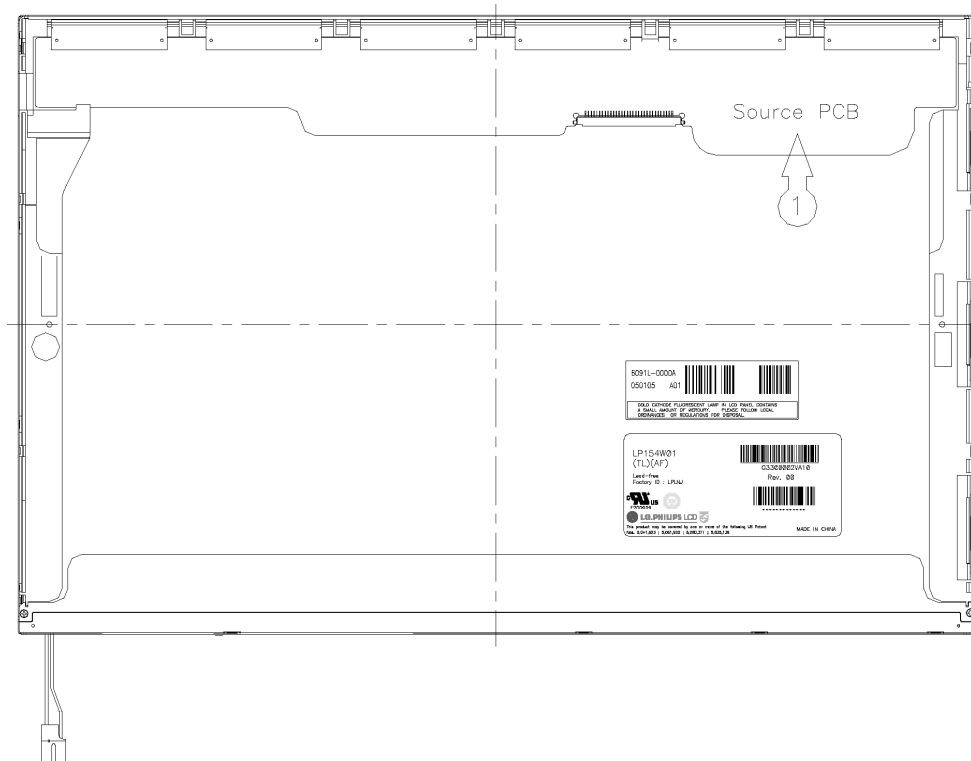


Figure 4-51 Replacing LG.Philips fluorescent lamp (WXGA) (5)

Assembly of Source PCB

1. Assembly of Source PCB.

CAUTION: Stress should not be given on TCP.



Assembly of Top Case

1. Assembly of Top Case.

CAUTION: Pressure should not be given on Source TCP and Gate COF.

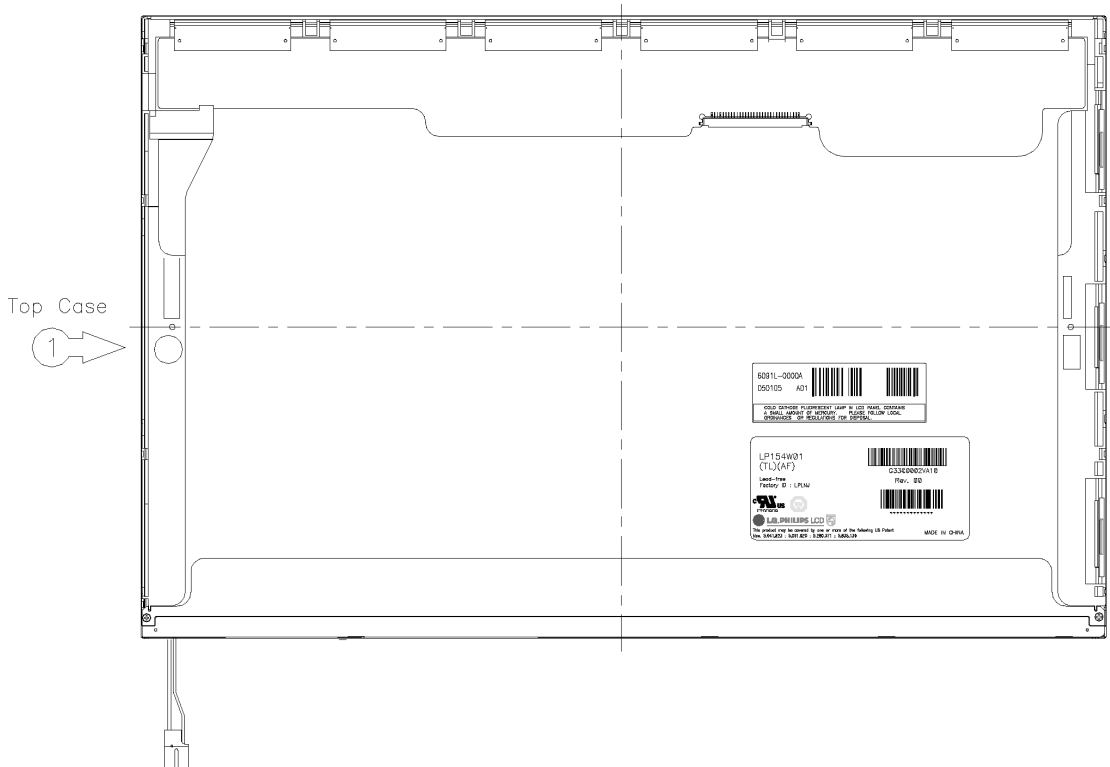


Figure 4-53 Replacing LG.Philips fluorescent lamp (WXGA) (7)

Assembly of outside Tape and Cover shield

1. Assembly of Cover shield (S).

CAUTION: Pressure or stress should not be given on Source PCB.
Usage of gloves with anti-electric discharge coating is recommended.
To eliminate possible damage on circuits occurred by ESC.

2. Assembly of Cover shield (G).

CAUTION: Pressure or stress should not be given on Gate TCP.

3. Assembly of Tape Adhesive used for Top case fixing.
4. Assembly of Tape Adhesive used for B/L Wire fixing.

CAUTION: Pressure or stress should not be given on Top case during this process.

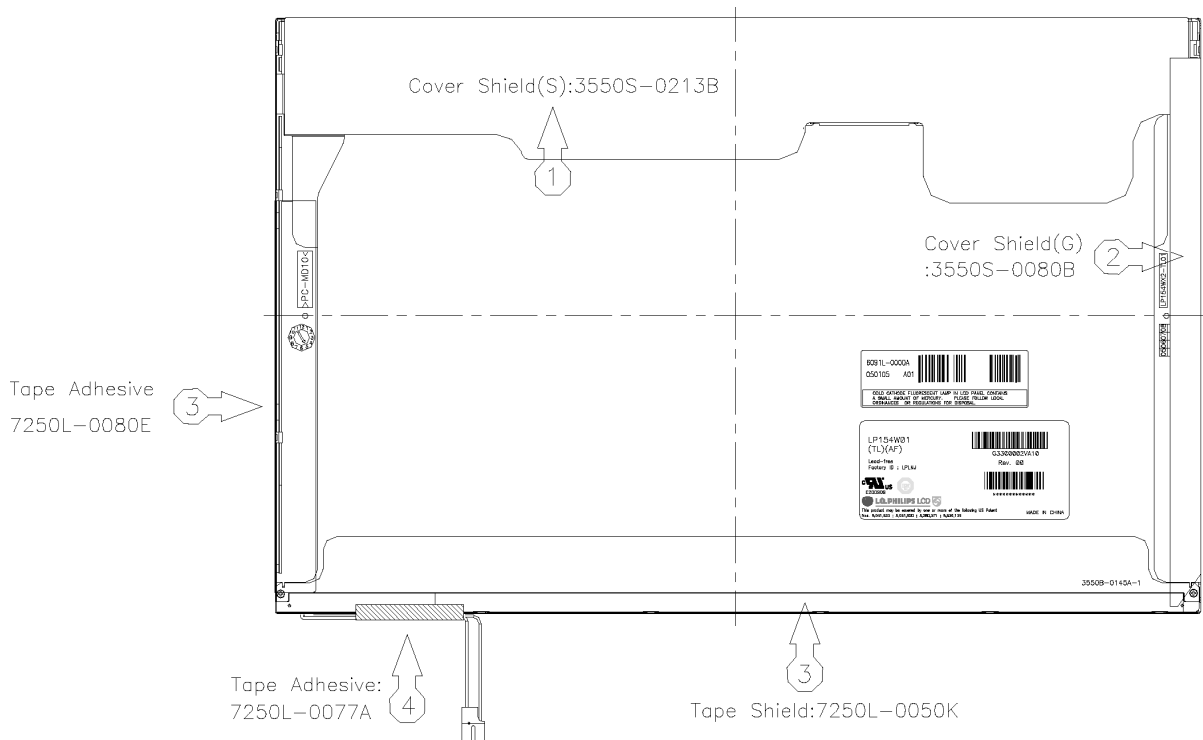


Figure 4-54 Replacing LG.Philips fluorescent lamp (WXGA) (8)

4.31.2 Replacing the 15.4-inch WXGA Samsung Fluorescent Lamp

To replace the 15.4-inch WXGA Samsung fluorescent lamp, follow the steps below and refer to figures 4-55 to 4-58.

Removing the fluorescent lamp

1. Remove the PCB cover.

CAUTION: Handle with care not to damage COF of S/D ICs.

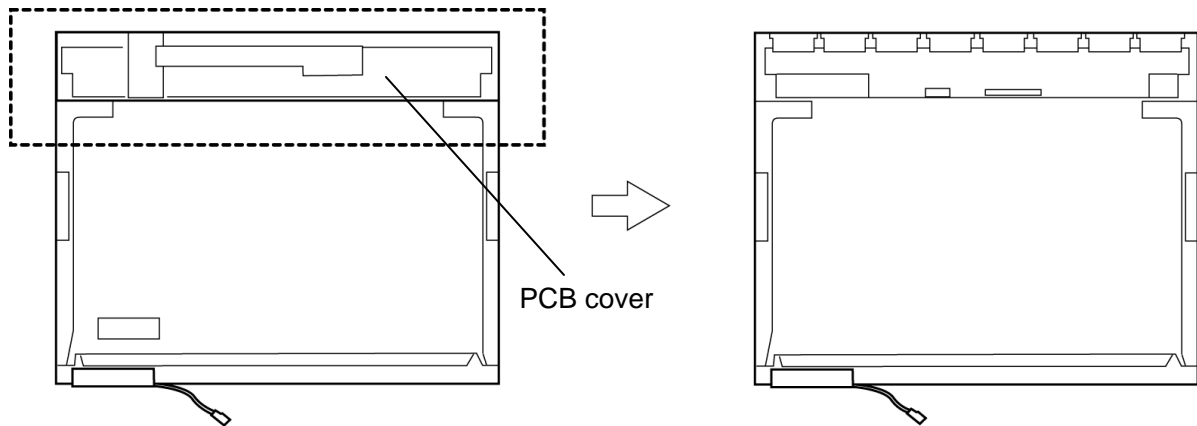


Figure 4-55 Replacing Samsung fluorescent lamp (WXGA) (1)

- Remove the yellow tapes and Al tape.

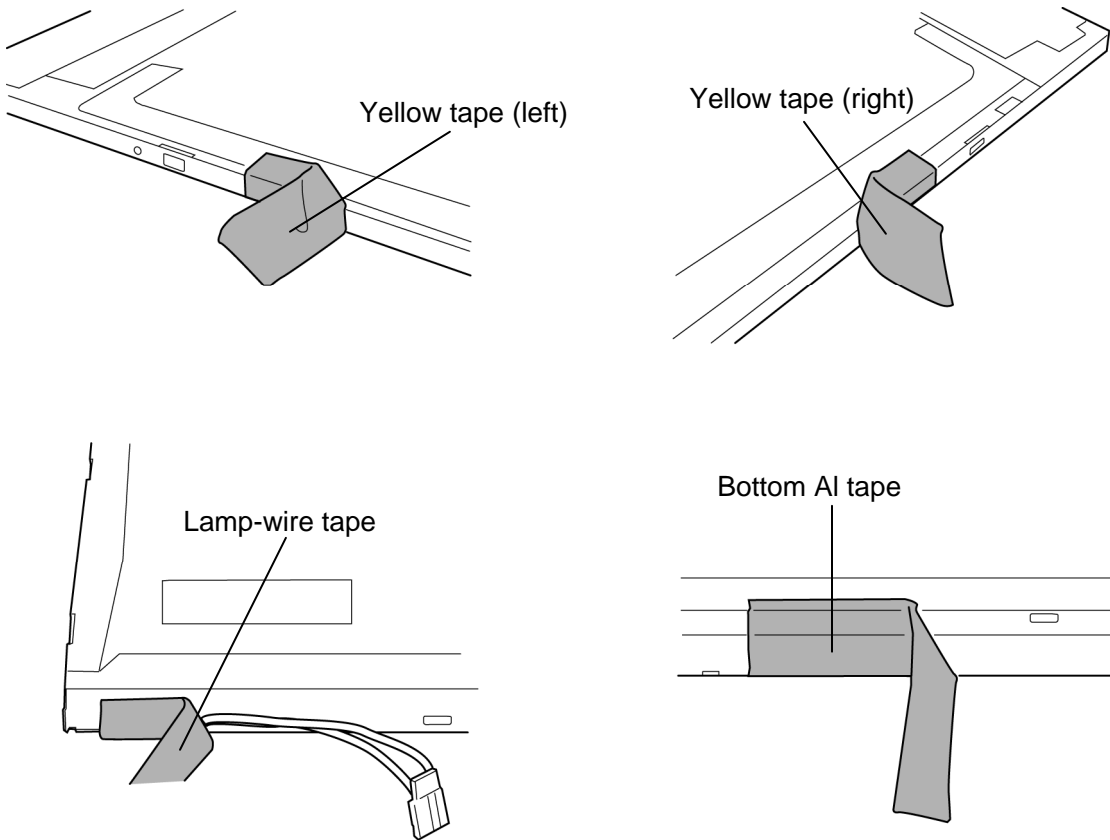


Figure 4-56 Replacing Samsung fluorescent lamp (WXGA) (2)

- Remove the top chassis from the molded frame.

CAUTION: Remove in the order of bottom hook and side hook.

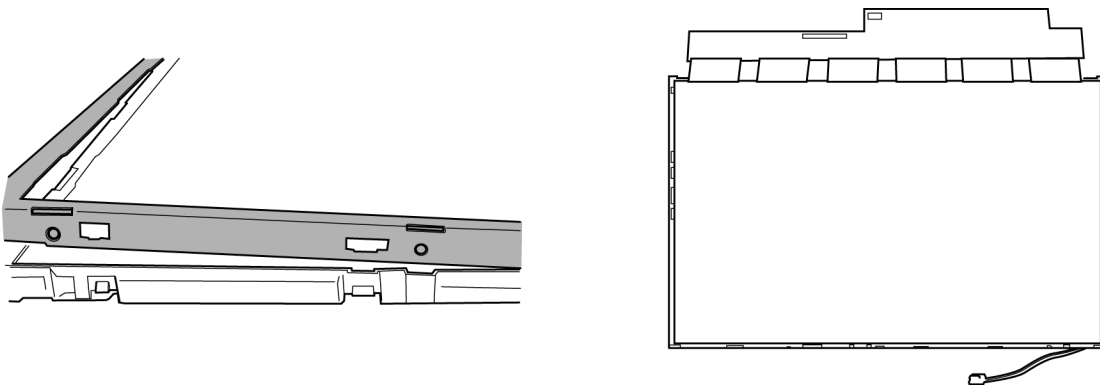


Figure 4-57 Replacing Samsung fluorescent lamp (WXGA) (3)

4. Separate the panel assembly and backlight unit.

CAUTION: Handle with care not to damage COF of S/D ICs.

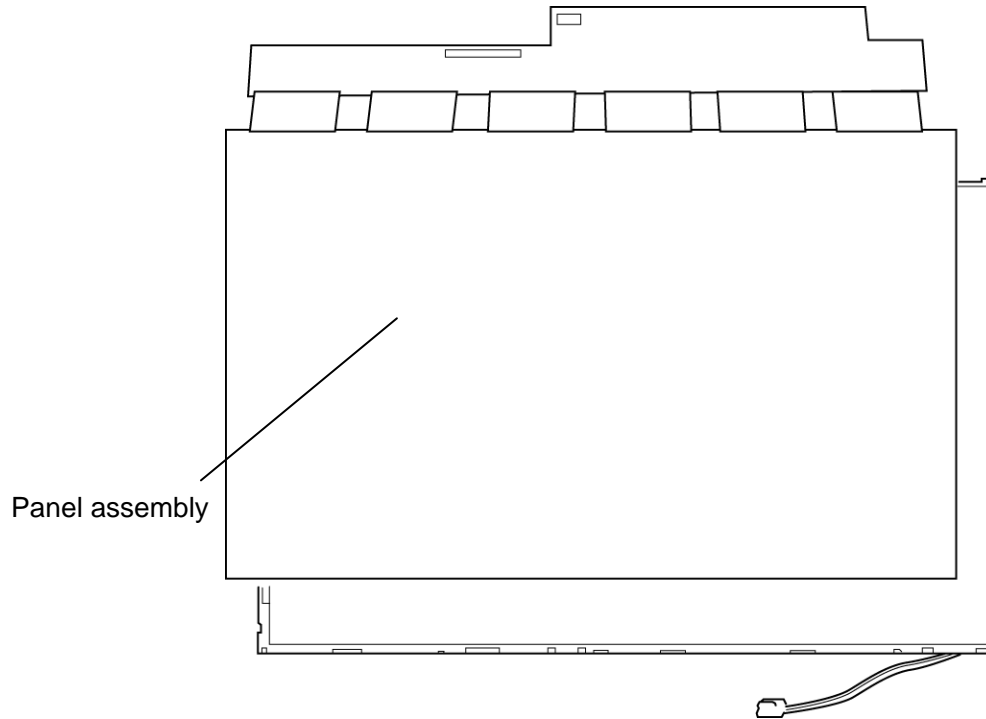


Figure 4-58 Replacing Samsung fluorescent lamp (WXGA) (4)

Assembling the fluorescent lamp

The assembly procedure of the 15.4-inch Samsung fluorescent lamp is the reverse of the above disassembly procedure. Refer to figures 4-55 to 4-58.

1. Install the panel assembly on the backlight unit.
2. Install the top chassis on the molded frame.
3. Stick the white tape and Al tape.
4. Stick the PCB cover.

Appendices

Appendix Contents

Appendix A Handling the LCD Module	A-1
Appendix B Board Layout.....	B-1
B.1 System Board (FHBIS*/FHBAS*) Front View	B-1
B.2 System Board (FHBIS*/FHBAS*) Back View	B-3
B.3 Fingerprint Sensor Board (FHBIS*/FHBAS*) View.....	B-5
B.4 SD card Board (FHBID*/FHBAD*) View	B-6
B.5 SV Board (FHBIR*/FHBAR*) View.....	B-7
Appendix C Pin Assignments	C-1
System board (FHBIS *)	
C.1 CN1400 SO-DIMM A connector (200-pin).....	C-1
C.2 CN1410 SO-DIMM B connector (200-pin).....	C-4
C.3 CN1850 HDD interface connector (11-pin).....	C-7
C.4 CN1810 ODD interface connector (50-pin)	C-8
C.5 CN2300 Docking interface connector (240-pin)	C-9
C.6 CN2110 PC card interface connector (68-pin)	C-13
C.7 CN2600 Wireless LAN card interface connector (52-pin)	C-14
C.8 CN3010 MDC interface connector (12-pin)	C-15
C.9 CN3011 MDC relay connector (4-pin)	C-15
C.10 CN3200 Keyboard interface connector (34-pin)	C-16
C.11 CN3240 PAD interface connector (8-pin)	C-16
C.12 CN9721 SW membrane interface connector (13-pin)	C-17
C.13 CN3490 LPC debug port interface connector (12-pin)	C-17
C.14 J4100 LAN interface connector (12-pin).....	C-17
C.15 CN4200 IEEE 1394 interface connector (4-pin)	C-18
C.16 CN4400 Bluetooth interface connector (20-pin)	C-18
C.17 CN4614 USB 6 connector (4-pin)	C-18
C.18 CN4614 USB 4 connector (4-pin)	C-19
C.19 CN4614 USB 0 connector (4-pin)	C-19
C.20 CN5000 LCD interface connector (40-pin)	C-20

C.21	CN5080 RGB connector (15-pin).....	C-21
C.22	J6051 External microphone connector (6-pin)	C-21
C.23	CN6170 Speaker connector (4-pin)	C-21
C.24	J6310 Headphone connector (5-pin).....	C-22
C.25	CN8800 DC-IN connector (4-pin).....	C-22
C.26	CN8810 Main Battery connector (10-pin).....	C-22
C.27	CN9300 RTC Battery connector (3-pin).....	C-22
C.28	CN8771 FAN interface connector (4-pin)	C-23
C.29	CN9600 SV board (FHBIR*) interface connector (20-pin)	C-23
C.30	CN9700 Fingerprint sensor board (FHBIS*) interface connector (6-pin).....	C-23
C.31	CN9720 SD card board (FHBID*) interface connector (20-pin)	C-24
SV Board (FHBIR*)		
C.32	CN9610 System board interface connector (20-pin)	C-25
C.33	CN9611 S-Video connector (6-pin)	C-25
C.34	CN5501 Serial interface connector (9-pin).....	C-25
Fingerprint Sensor Board (FHBIS*)		
C.35	CN9540 System board interface connector (8-pin)	C-26
SD card Board (FHBID*)		
C.36	CN9550 System board interface connector (20-pin)	C-27
C.37	IS2101 SD card interface connector (12-pin)	C-27
System board (FHBAS *)		
C.38	CN1400 SO-DIMM 0 connector (200-pin)	C-28
C.39	CN1410 SO-DIMM 1 connector (200-pin)	C-31
C.40	CN1850 HDD interface connector (11-pin).....	C-34
C.41	CN1810 ODD interface connector (50-pin)	C-35
C.42	CN3200 Docking interface connector (240-pin)	C-36
C.43	CN2600 Wireless LAN card interface connector (52-pin)	C-40
C.44	CN3490 LPC debug port interface connector (12-pin)	C-41
C.45	J4100 LAN interface connector (12-pin).....	C-41
C.46	CN4610 USB 3 port connector (4-pin).....	C-41
C.47	CN4611 USB 4 port connector (4-pin).....	C-42
C.48	CN4612 USB 0 port connector (4-pin).....	C-42

C.49	CN5000 LCD interface connector (40-pin)	C-43
C.50	CN9600 SV board (FHBAR*) interface connector (20-pin).....	C-44
C.51	CN9700 Fingerprint sensor board (FHBAS*) interface connector (6-pin)	C-44
C.52	CN9720 SD card board (FHBAD*) interface connector (20-pin).....	C-45
SV Board (FHBAR*)		
C.53	CN9610 System board interface connector (20-pin)	C-46
C.54	CN9611 S-Video connector (6-pin)	C-46
C.55	CN5501 Serial interface connector (9-pin).....	C-46
Fingerprint Sensor Board (FHBAS*)		
C.56	CN9540 System board interface connector (8-pin)	C-47
SD Card Board (FHBAD*)		
C.57	CN9730 System board interface connector (20-pin)	C-48
C.58	IS2101 SD card interface connector (12-pin)	C-48
Appendix D Keyboard Scan/Character Codes		D-1
Appendix E Key Layout.....		E-1
E.1	United Kingdom (UK) Keyboard	E-1
E.2	United States (US) Keyboard.....	E-1
Appendix F Wiring Diagrams		F-1
F.1	RGB Monitor Loopback Connector.....	F-1
F.2	RS-232C Loopback Connector	F-1
F.3	RS-232C direct connection cable (9-pin to 9-pin).....	F-2
F.4	RS-232C direct connection cable (9-pin to 25-pin).....	F-2
F.5	LAN Loopback Connector.....	F-3
Appendix G BIOS rewrite Procedures		G-1
Appendix H EC/KBC rewrite Procedures.....		H-1
Appendix I Reliability		I-1

Figures

Figure B-1	System board (FHBIS*/FHBAS*) layout (front)	B-1
Figure B-2	System board (FHBIS*/FHBAS*) layout (back)	B-3
Figure B-3	Fingerprint Sensor board (FHBIS*/FHBAS*) layout (front/back)	B-5
Figure B-4	SD card board (FHBID*/FHBAD*) layout (front/back)	B-6
Figure B-5	SV board (FHBIR*/FHBAR*) layout (front/back)	B-7
Figure E-1	UK keyboard.....	E-1
Figure E-2	US keyboard.....	E-1
Figure F-1	RGB Monitor Loopback Connector	F-1
Figure F-2	RS-232C Loopback Connector.....	F-1
Figure F-3	RS-232C direct connection cable (9-pin to 9-pin)	F-2
Figure F-4	RS-232C direct connection cable (9-pin to 25-pin)	F-2
Figure F-5	LAN Loopback Connector	F-3

Tables

Table B-1	System board (FHBIS*/FHBAS*) connectors (front)	B-2
Table B-2	System board (FHBIS*/FHBAS*) connectors and ICs (back)	B-4
Table B-3	Fingerprint Sensor board (FHBIS*/FHBAS*) connector (front).....	B-5
Table B-4	SD card board (FHBID*/FHBAD*) connector (back)	B-6
Table B-5	SV board (FHBIR*/FHBAR*) connector (back).....	B-7

System board

System board (FHBIS *)

Table C-1	SO-DIMM A connector (200-pin)	C-1
Table C-2	SO-DIMM B connector (200-pin).....	C-4
Table C-3	HDD interface connector (11-pin).....	C-7
Table C-4	ODD interface connector (50-pin).....	C-8

Table C-5	Docking interface connector (240-pin)	C-9
Table C-6	PC card interface connector (68-pin)	C-13
Table C-7	Wireless LAN card interface connector (52-pin)	C-14
Table C-8	MDC interface connector (12-pin)	C-15
Table C-9	MDC relay connector (4-pin)	C-15
Table C-10	Keyboard interface connector (34-pin)	C-16
Table C-11	PAD interface connector (8-pin).....	C-16
Table C-12	SW membrane interface connector (13-pin)	C-17
Table C-13	LPC debug port interface connector (12-pin).....	C-17
Table C-14	LAN interface connector (12-pin)	C-17
Table C-15	IEEE 1394 interface connector (4-pin).....	C-18
Table C-16	Bluetooth interface connector (20-pin)	C-18
Table C-17	USB 6 connector (4-pin)	C-18
Table C-18	USB 4 connector (4-pin)	C-19
Table C-19	USB 0 connector (4-pin)	C-19
Table C-20	LCD interface connector (40-pin)	C-20
Table C-21	RGB connector (15-pin).....	C-21
Table C-22	External microphone connector (6-pin).....	C-21
Table C-23	Speaker connector (4-pin)	C-21
Table C-24	Headphone connector (5-pin).....	C-22
Table C-25	DC-IN connector (4-pin)	C-22
Table C-26	Main Battery connector (10-pin).....	C-22
Table C-27	RTC Battery connector (3-pin).....	C-22
Table C-28	FAN interface connector (4-pin).....	C-23
Table C-29	SV board (FHBIR*) interface connector (20-pin).....	C-23
Table C-30	Fingerprint sensor board (FHBIS*) interface connector (6-pin).....	C-23
Table C-31	SD card board (FHBID*) interface connector (20-pin)	C-24
SV Board (FHBIR*)		
Table C-32	System board interface connector (20-pin)	C-25
Table C-33	S-Video connector (6-pin)	C-25
Table C-34	Serial interface connector (9-pin).....	C-25

Fingerprint Sensor Board (FHBIS*)

Table C-35 System board interface connector (8-pin) C-26

SD card Board (FHBID*)

Table C-36 System board interface connector (20-pin) C-27

Table C-37 SD card interface connector (12-pin) C-27

System board (FHBAS*)

Table C-38 SO-DIMM 0 connector (200-pin) C-28

Table C-39 SO-DIMM 1 connector (200-pin) C-31

Table C-40 HDD interface connector (11-pin)..... C-34

Table C-41 ODD interface connector (50-pin)..... C-35

Table C-42 Docking interface connector (240-pin) C-36

Table C-43 Wireless LAN card interface connector (52-pin) C-40

Table C-44 LPC debug port interface connector (12-pin)..... C-41

Table C-45 LAN interface connector (12-pin) C-41

Table C-46 USB 3 port connector (4-pin) C-41

Table C-47 USB 4 port connector (4-pin) C-42

Table C-48 USB 0 port connector (4-pin) C-42

Table C-49 LCD interface connector (40-pin) C-43

Table C-50 SV board (FHBAR*) interface connector (20-pin) C-44

Table C-51 Fingerprint sensor board (FHBAS*) interface connector (6-pin) C-44

Table C-52 SD card board (FHBAD*) interface connector (20-pin) C-45

SV Board (FHBAR*)

Table C-53 System board interface connector (20-pin) C-46

Table C-54 S-Video connector (6-pin) C-46

Table C-55 Serial interface connector (9-pin)..... C-46

Fingerprint Sensor Board (FHBAS*)

Table C-56 System board interface connector (8-pin) C-47

SD Card Board (FHBAD*)

Table C-57 System board interface connector (20-pin) C-48

Table C-58 SD card interface connector (12-pin) C-48

Table D-1 Scan codes (set 1 and set 2) D-1

Table D-2 Scan codes with left Shift keyD-5
Table D-3 Scan codes in Numlock modeD-6
Table D-4 Scan codes with Fn keyD-6
Table D-5 Scan codes in overlay modeD-7
Table D-6 No.124 key scan code.....D-7
Table D-7 No.126 key scan code.....D-8

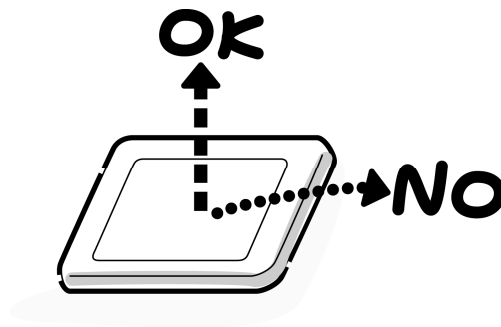
Table I-1 MTBF I-1

Appendix A Handling the LCD Module

Precautions for handling the LCD module

The LCD module can be easily damaged during assembly or disassembly. Observe the following precautions when handling the LCD module:

1. When installing the LCD module in the LCD cover, be sure to seat it so that it is properly aligned and maximum visibility of the display is maintained.



2. For the LCD module, be careful to align the four holes at the right side and left side of the LCD module with the corresponding holes in the LCD cover before securing the module with four screws.

Do not force the module into place, because stress can affect its performance. Also, the panel's surface is easily scarred, so be carefully when handling it.



3. If the panel's surface gets dirty, wipe it with cotton or a soft cloth. If it is still dirty, try breathing on the surface to create a light condensate and wipe it again.

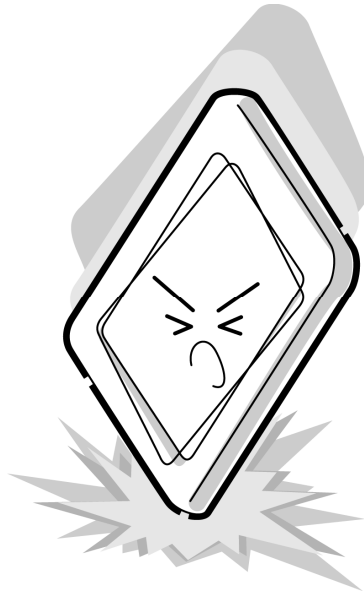
If the surface is very dirty, we recommend a LCD cleaning agent. Apply the agent to a cloth and then wipe the panel's surface. Do not apply cleanser directly to the panel.



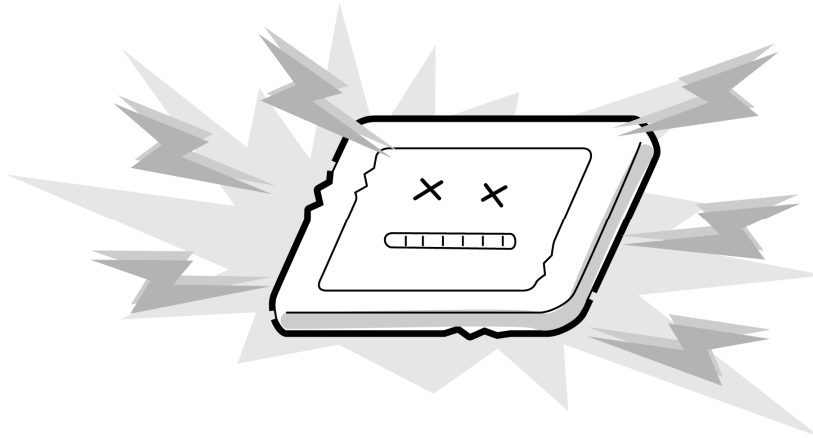
4. If water or other liquid is left on the panel's surface for a long period, it can change the screen's tint or stain it. Be sure to quickly wipe off any liquid.



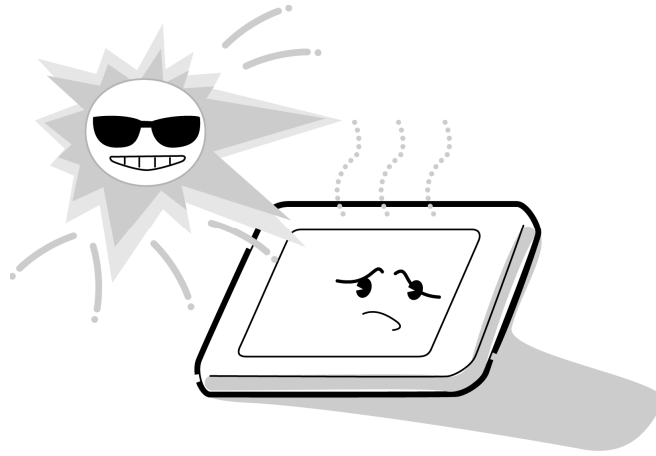
5. Glass is used in the panel, so be careful not to drop it or let it strike a hard object, which could cause breakage or cracks.



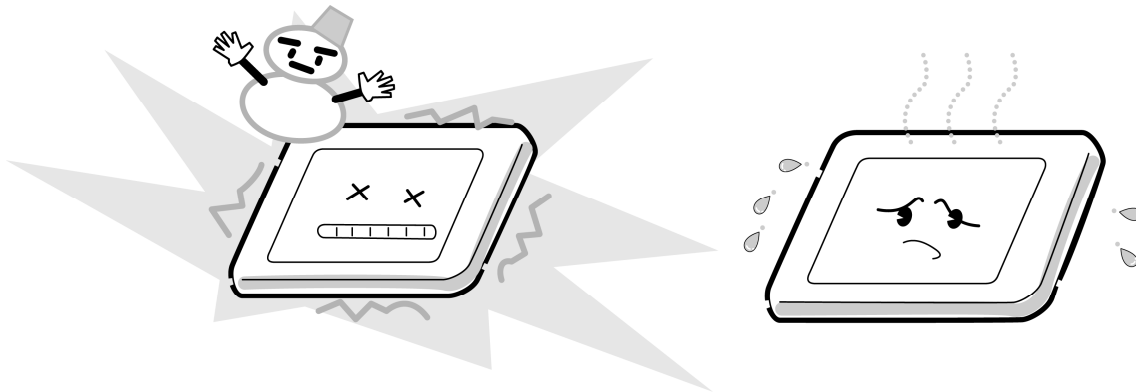
6. CMOS-LSI circuits are used in the module, so guard against damage from electrostatic discharge. Be sure to wear a wrist or ankle ground when handling the module.



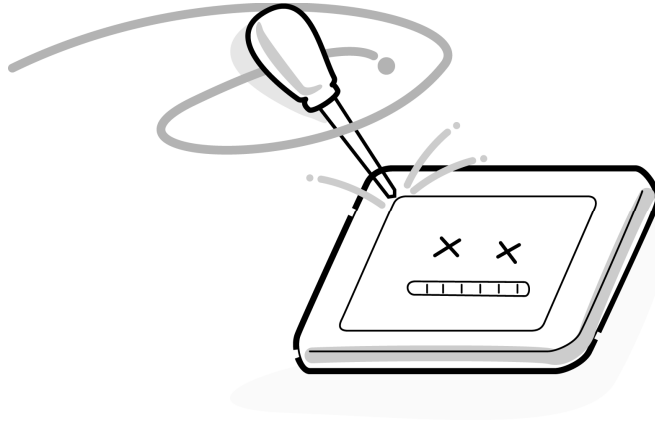
7. Do not expose the module to direct sunlight or strong ultraviolet rays for long periods.



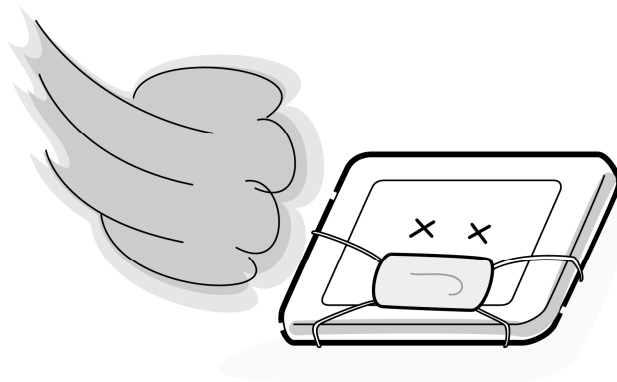
8. Do not store the module at temperatures below specifications. Cold can cause the liquid crystals to freeze, lose their elasticity or otherwise suffer damage.



9. Do not disassemble the LCD module. Disassembly can cause malfunctions.



10. If you transport the module, do not use packing material that contains epoxy resin (amine) or silicon glue (alcohol or oxime). These materials can release gas that can damage the panel's polarization.



Appendix B Board Layout

B.1 System board (FHBIS*/FHBAS*) Front View

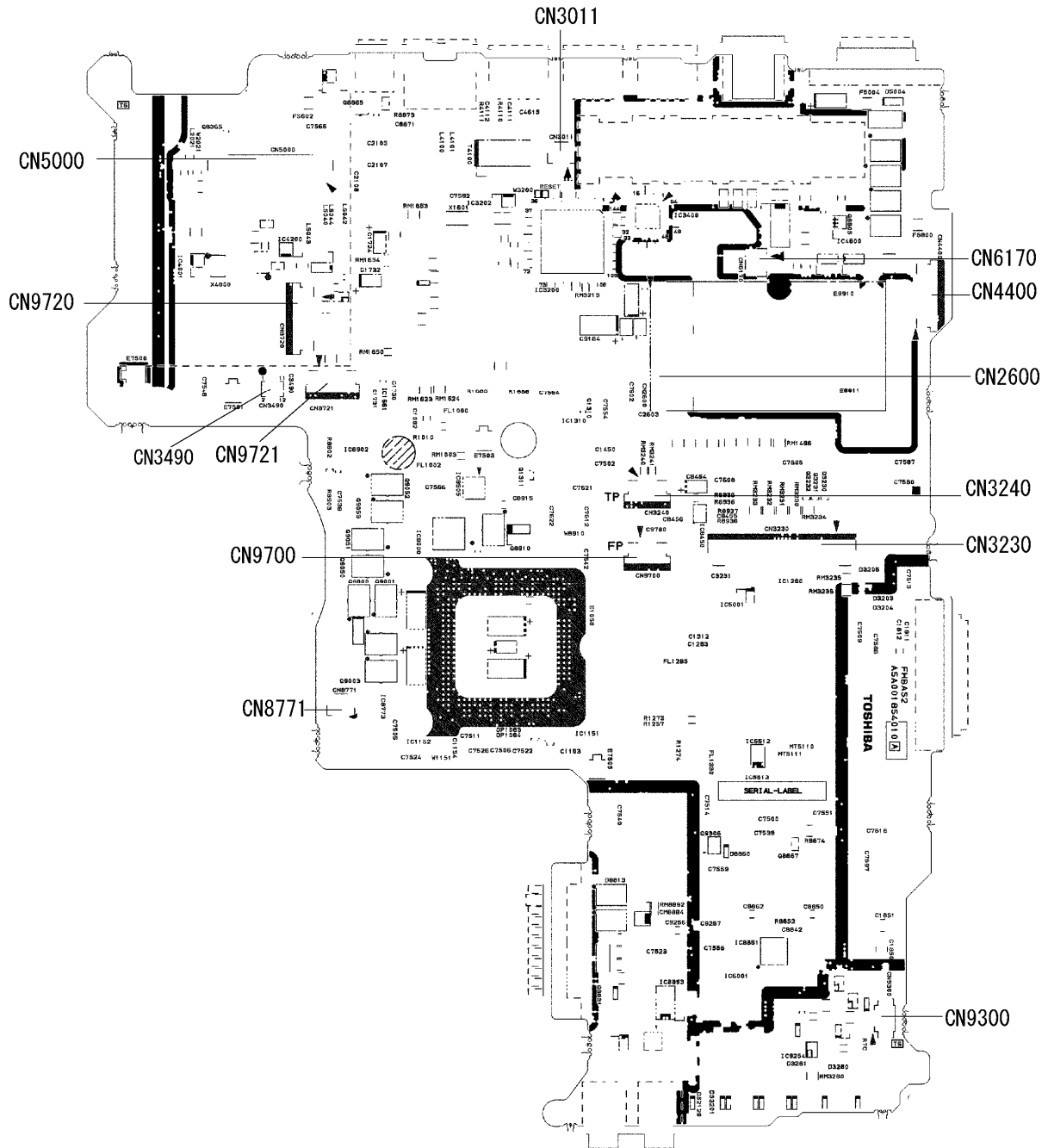


Figure B-1 System board (FHBIS*/FHBAS*) layout (front)

Table B-1 System board (FHBIS*/FHBAS*) connectors (front)

Number	Name
CN3011	Modem cable relay connector
CN5000	LCD I/F connector
CN9720	ID*/AD* board I/F connector
CN9721	SW membrane I/F connector
CN9700	IS*/AS* board I/F connector
CN8771	Fan connector
CN9300	RTC battery connector
CN3230	Keyboard I/F connector
CN3240	Touchpad connector
CN2600	Wireless LAN card I/F connector
CN4400	Bluetooth module I/F connector
CN6170	Internal speaker connector
CN3490	Debugging port

B.2 System board (FHBIS*/FHBAS*) Back View

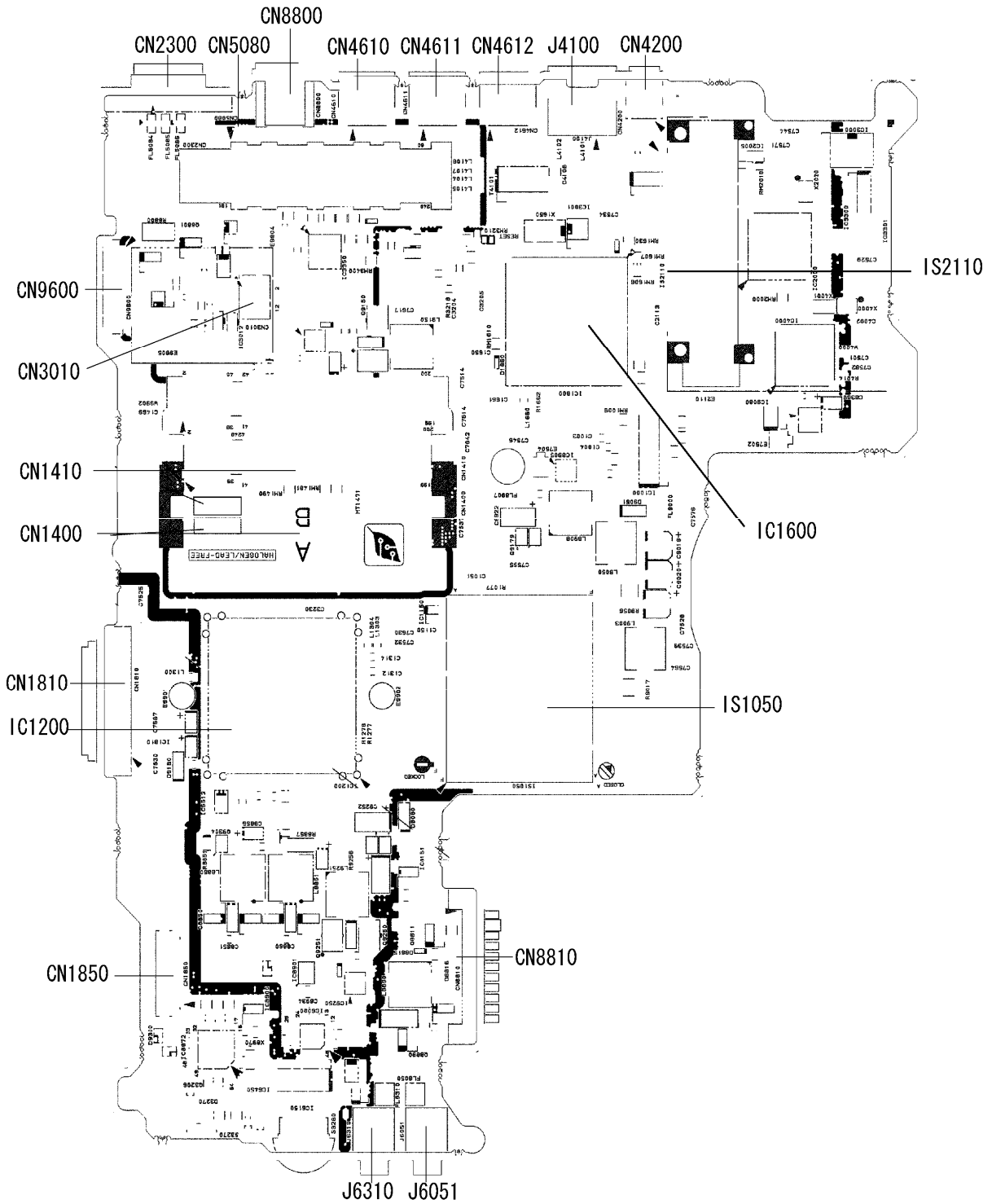


Figure B-2 System board (FHBIS*/FHBAS*) layout (back)

Table B-2 System board (FHBIS*/FHBAS*) connectors and ICs (back)

Number	Name
CN4200	1394 I/F connector
J4100	LAN jack
CN4612	USB port 0
CN4611	USB port 4
CN4610	USB port 6
CN8800	DC-IN connector
CN5080	RGB I/F connector
CN2300	Docking I/F connector
CN9600	IR*/AR* board I/F connector
CN3010	MDC I/F connector
CN1410	Memory B/(1) connector
CN1400	Memory A/(0) connector
CN1810	ODD connector
CN1850	HDD connector
J6310	Headphone jack
J6051	External microphone jack
CN8810	Main battery Memory connector
IS2110	PC card I/F connector
IC1200	South Bridge (GMCH/RC420M)
IC1600	North Bridge (ICH-7/IXP450)
IS1050	CPU

B.3 Fingerprint Sensor board (FHBIS*/FHBAS*) View

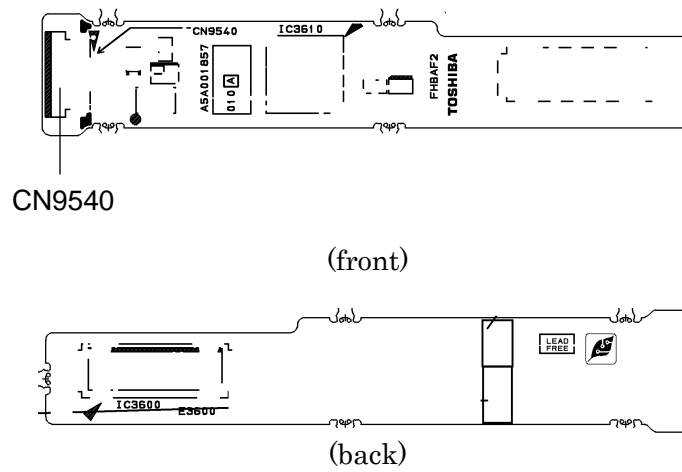


Figure B-3 Fingerprint Sensor board (FHBIS*/FHBAS*) layout (front/back)

Table B-3 Fingerprint Sensor board (FHBIS*/FHBAS*) connector (front)

Number	Name
CN9540	System board I/F connector

B.4 SD card board (FHBID*/FHBAD*) View

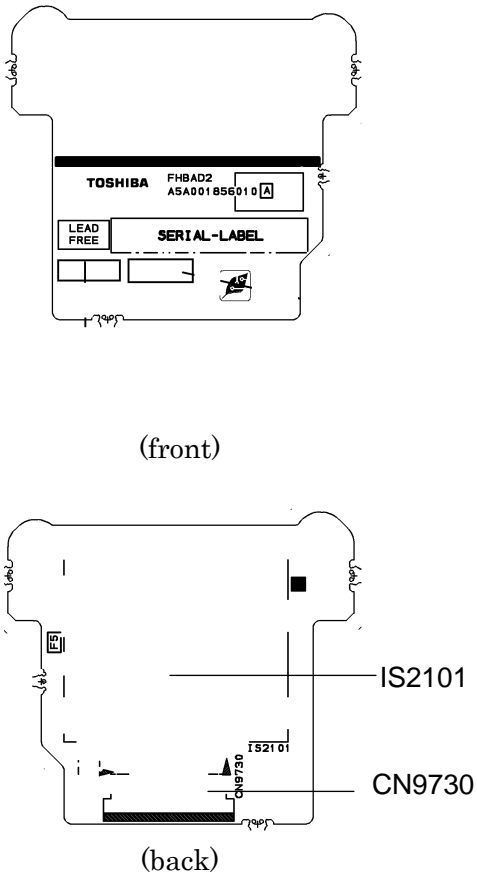


Figure B-4 SD card board (FHBID*/FHBAD*) layout (front/back)

Table B-4 SD card board (FHBID*/FHBAD*) connector (back)

Number	Name
CN9730	System board I/F connector
IS2101	SD card I/F connector

Appendix C Pin Assignments

[Intel Chipset model]

System board (FHBIS*)

C.1 CN1400 SO-DIMM A connector (200-pin)

Table C-1 SO-DIMM A connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MR0R9-B0V	-	2	GND	-
3	GND	-	4	ADQ04-B1P	I/O
5	ADQ07-B1P	I/O	6	ADQ06-B1P	I/O
7	ADQ00-B1P	I/O	8	GND	-
9	GND	-	10	ADM0-B1P	I/O
11	ADQS0-B1N	I/O	12	GND	-
13	ADQS0-B1P	I/O	14	ADQ05-B1P	I/O
15	GND	-	16	ADQ01-B1P	I/O
17	ADQ03-B1P	I/O	18	GND	-
19	ADQ02-B1P	I/O	20	ADQ12-B1P	I/O
21	GND	-	22	ADQ13-B1P	I/O
23	ADQ14-B1P	I/O	24	GND	-
25	ADQ08-B1P	I/O	26	ADM1-B1P	I/O
27	GND	-	28	GND	-
29	ADQS1-B1N	I/O	30	MCK0-B1P	O
31	ADQS1-B1P	I/O	32	MCK0-B1N	O
33	GRD	-	34	GND	-
35	ADQ15-B1P	I/O	36	ADQ10-B1P	I/O
37	ADQ09-B1P	I/O	38	ADQ11-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	ADQ21-B1P	I/O	44	ADQ17-B1P	I/O
45	ADQ20-B1P	-	46	ADQ16-B1P	I/O
47	GND	-	48	GND	-
49	ADQS2-B1N	I/O	50	NC	-
51	ADQS2-B1P	I/O	52	ADM2-B1P	I/O
53	GND	-	54	GND	-
55	ADQ23-B1P	I/O	56	ADQ18-B1P	I/O
57	ADQ19-B1P	I/O	58	ADQ22-B1P	I/O
59	GND	-	60	GND	-

Table C-1 SO-DIMM A connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
61	ADQ25-B1P	I/O	62	ADQ29-B1P	I/O
63	ADQ28-B1P	I/O	64	ADQ24-B1P	I/O
65	GND	-	66	GND	-
67	ADM3-B1P	I/O	68	ADQS3-B1N	I/O
69	NC	-	70	ADQS3-B1P	I/O
71	GND	-	72	GND	-
73	ADQ30-B1P	I/O	74	ADQ27-B1P	I/O
75	ADQ26-B1P	I/O	76	ADQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE0-B1P	O	80	MCKE1-B1P	O
81	1R8-B1V	-	82	1R8-B1V	-
83	NC	-	84	NC	-
85	ABS2-B1P	O	86	NC	-
87	1R8-B1V	-	88	1R8-B1V	-
89	AMA12-B1P	O	90	AMA11-B1P	O
91	AMA09-B1P	O	92	AMA07-B1P	O
93	AMA08-B1P	O	94	AMA06-B1P	O
95	1R8-B1V	-	96	1R8-B1V	I
97	AMA05-B1P	O	98	AMA04-B1P	O
99	AMA03-B1P	O	100	AMA02-B1P	O
101	AMA01-B1P	O	102	AMA00-B1P	O
103	1R8-B1V	-	104	1R8-B1V	-
105	AMA10-B1P	O	106	ABS1-B1P	O
107	ABS0-B1P	O	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS0-B1N	O
111	1R8-B1V	-	112	1R8-B1V	-
113	ACAS-B1N	O	114	MODT0-B1P	O
115	MCS1-B1N	O	116	AMA13-B1P	I/O
117	1R8-B1V	-	118	1R8-B1V	-
119	MODT1-B1P	O	120	NC	-
121	GND	-	122	GND	-
123	ADQ34-B1P	I/O	124	ADQ36-B1P	I/O
125	ADQ33-B1P	I/O	126	ADQ37-B1P	I/O
127	GND	-	128	GND	-
129	ADQS4-B1N	I/O	130	ADM4-B1P	O
131	ADQS4-B1P	I/O	132	GND	-

Table C-1 SO-DIMM A connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
133	GND	-	134	ADQ35-B1P	I/O
135	ADQ39-B1P	I/O	136	ADQ32-B1P	I/O
137	ADQ38-B1P	I/O	138	GND	-
139	GND	-	140	ADQ44-B1P	I/O
141	ADQ40-B1P	I/O	142	ADQ41-B1P	I/O
143	ADQ45-B1P	I/O	144	GND	-
145	GND	-	146	ADQS5-B1N	I/O
147	ADM5-B1P	O	148	ADQS5-B1P	I/O
149	GND	-	150	GND	-
151	ADQ42-B1P	I/O	152	ADQ46-B1P	I/O
153	ADQ43-B1P	I/O	154	ADQ47-B1P	I/O
155	GND	-	156	GND	-
157	ADQ48-B1P	I/O	158	ADQ52-B1P	I/O
159	ADQ49-B1P	I/O	160	ADQ53-B1P	I/O
161	GND	-	162	GND	-
163	NC	-	164	MCK1-B1P	O
165	GND	-	166	MCK1-B1N	O
167	ADQS6-B1N	I/O	168	GND	-
169	ADQS6-B1P	I/O	170	ADM6-B1P	O
171	GND	-	172	GND	-
173	ADQ55-B1P	I/O	174	ADQ54-B1P	I/O
175	ADQ51-B1P	I/O	176	ADQ50-B1P	I/O
177	GND	-	178	GND	-
179	ADQ56-B1P	I/O	180	ADQ60-B1P	I/O
181	ADQ57-B1P	I/O	182	ADQ61-B1P	I/O
183	GND	-	184	GND	-
185	ADM7-B1P	O	186	ADQS7-B1N	I/O
187	GND	-	188	ADQS7-B1P	I/O
189	ADQ58-B1P	I/O	190	GND	-
191	ADQ62-B1P	I/O	192	ADQ59-B1P	I/O
193	GND	-	194	ADQ63-B1P	I/O
195	SMBDA0-P3P	I/O	196	GND	-
197	SMBCK0-P3P	I/O	198	GND	-
199	P3V	-	200	GND	-
1T	GND	-	2T	GND	-

C.2 CN1410 SO-DIMM B connector (200-pin)*Table C-2 SO-DIMM B connector (200-pin) (1/3)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRBREF-B0V	-	2	GND	-
3	GND	-	4	BDQ01-B1P	I/O
5	BDQ07-B1P	I/O	6	BDQ04-B1P	I/O
7	BDQ06-B1P	I/O	8	GND	-
9	GND	-	10	BDM0-B1P	I/O
11	BDQS0-B1N	I/O	12	GND	-
13	BDQS0-B1P	I/O	14	BDQ05-B1P	I/O
15	GND	-	16	BDQ00-B1P	I/O
17	BDQ03-B1P	I/O	18	GND	-
19	BDQ02-B1P	I/O	20	BDQ12-B1P	I/O
21	GND	-	22	BDQ13-B1P	I/O
23	BDQ08-B1P	I/O	24	GND	-
25	BDQ09-B1P	I/O	26	BDM1-B1P	I/O
27	GND	-	28	GND	-
29	BDQS1-B1N	I/O	30	MCK3-B1P	O
31	BDQS1-B1P	I/O	32	MCK3-B1N	O
33	GND	-	34	GND	-
35	BDQ10-B1P	I/O	36	BDQ14-B1P	I/O
37	BDQ11-B1P	I/O	38	BDQ15-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	BDQ16-B1P	I/O	44	BDQ17-B1P	I/O
45	BDQ21-B1P	-	46	BDQ20-B1P	I/O
47	GND	-	48	GND	-
49	BDQS2-B1N	I/O	50	NC	-
51	BDQS2-B1P	I/O	52	BDM2-B1P	I/O
53	GND	-	54	GND	-
55	BDQ23-B1P	I/O	56	BDQ18-B1P	I/O
57	BDQ22-B1P	I/O	58	BDQ19-B1P	I/O
59	GND	-	60	GND	-
61	BDQ29-B1P	I/O	62	BDQ25-B1P	I/O

Table C-2 SO-DIMM B connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	BDQ28-B1P	I/O	64	BDQ24-B1P	I/O
65	GND	-	66	GND	-
67	BDM3-B1P	I/O	68	BDQS3-B1N	I/O
69	NC	-	70	BDQS3-B1P	I/O
71	GND	-	72	GND	-
73	BDQ26-B1P	I/O	74	BDQ30-B1P	I/O
75	BDQ27-B1P	I/O	76	BDQ31-B1P	I/O
77	GND	-	78	GND	-
79	MCKE2-B1P	O	80	MCKE3-B1P	O
81	1R8-B1V	-	82	1R8-B1V	-
83	NC	-	84	NC	-
85	BBS2-B1P	O	86	NC	-
87	1R8-B1V	-	88	1R8-B1V	-
89	BMA12-B1P	O	90	BMA11-B1P	O
91	BMA09-B1P	O	92	BMA07-B1P	O
93	BMA08-B1P	O	94	BMA06-B1P	O
95	1R8-B1V	-	96	1R8-B1V	I
97	BMA05-B1P	O	98	BMA04-B1P	O
99	BMA03-B1P	O	100	BMA02-B1P	O
101	BMA01-B1P	O	102	BMA00-B1P	O
103	1R8-B1V	-	104	1R8-B1V	-
105	BMA10-B1P	O	106	BBS1-B1P	O
107	BBS0-B1P	O	108	BRAS-B1N	I
109	BWE-B1N	I	110	MCS2-B1N	O
111	1R8-B1V	-	112	1R8-B1V	-
113	BCAS-B1N	-	114	MODT2-B1P	O
115	MCS3-B1N	O	116	BMA13-B1P	I/O
117	1R8-B1V	-	118	1R8-B1V	-
119	MODT3-B1P	O	120	NC	-
121	GND	-	122	GND	-
123	BDQ32-B1P	I/O	124	BDQ36-B1P	I/O
125	BDQ33-B1P	I/O	126	BDQ37-B1P	I/O
127	GND	-	128	GND	-
129	BDQS4-B1N	I/O	130	BDM4-B1P	O
131	BDQS4-B1P	I/O	132	GND	-
133	GND	-	134	BDQ38-B1P	I/O

Table C-2 SO-DIMM B connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
135	BDQ34-B1P	I/O	136	BDQ39-B1P	I/O
137	BDQ35-B1P	I/O	138	GND	-
139	GND	-	140	BDQ44-B1P	I/O
141	BDQ40-B1P	I/O	142	BDQ45-B1P	I/O
143	BDQ41-B1P	I/O	144	GND	-
145	GND	-	146	BDQS5-B1N	I/O
147	BDM5-B1P	O	148	BDQS5-B1P	I/O
149	GND	-	150	GND	-
151	BDQ47-B1P	I/O	152	BDQ46-B1P	I/O
153	BDQ42-B1P	I/O	154	BDQ43-B1P	I/O
155	GND	-	156	GND	-
157	BDQ48-B1P	I/O	158	BDQ53-B1P	I/O
159	BDQ52-B1P	I/O	160	BDQ49-B1P	I/O
161	GND	-	162	GND	-
163	NC	-	164	MCK2-B1P	O
165	GND	-	166	MCK2-B1N	O
167	BDQS6-B1N	I/O	168	GND	-
169	BDQS6-B1P	I/O	170	BDM6	O
171	GND	-	172	GND	-
173	BDQ51-B1P	I/O	174	BDQ50-B1P	I/O
175	BDQ54-B1P	I/O	176	BDQ55-B1P	I/O
177	GND	-	178	GND	-
179	BDQ57-B1P	I/O	180	BDQ56-B1P	I/O
181	BDQ61-B1P	I/O	182	BDQ60-B1P	I/O
183	GND	-	184	GND	-
185	BDM7-B1P	O	186	BDQS7-B1N	I/O
187	GND	-	188	BDQS7-B1P	I/O
189	BDQ58-B1P	I/O	190	GND	-
191	BDQ59-B1P	I/O	192	BDQ62-B1P	I/O
193	GND	-	194	BDQ63-B1P	I/O
195	SMBDA0-P3P	I/O	196	GND	-
197	SMBCK0-P3P	I/O	198	GND	-
199	P3V	-	200	P3V	-
1T	GND	-	2T	GND	-

C.3 CN1850 HDD interface connector (11-pin)*Table C-3 HDD interface connector (11-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZSATT0-P1P	O	2	ZSATT0-P1N	O
3	GND	-	4	ZSATR0-P1N	I
5	ZSATR0-P1P	I	6	GND	-
7	P3V	-	8	GND	-
9	P5V	-	10	GND	-
11	GND	-			
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.4 CN1810 ODD interface connector (50-pin)

Table C-4 ODD interface connector (50-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	GND	-	4	NC	-
5	PLTRS0-E3N + RSTTIDB-P3N	O	6	PDD08-P3P	I/O
7	PDD07-P3P	I/O	8	PDD09-P3P	I/O
9	PDD06-P3P	I/O	10	PDD10-P3P	I/O
11	PDD05-P3P	I/O	12	PDD11-P3P	I/O
13	PDD04-P3P	I/O	14	PDD12-P3P	I/O
15	PDD03-P3P	I/O	16	PDD13-P3P	I/O
17	PDD02-P3P	I/O	18	PDD14-P3P	I/O
19	PDD01-P3P	I/O	20	PDD15-P3P	I/O
21	PDD00-P3P	I/O	22	PDDREQ-P3P	I
23	GND	-	24	PDIOR-P3N	O
25	PDIOW-P3N	O	26	GND	-
27	PIORDY-P3P	I	28	PDDACK	-
29	IDEIRQ-P3P	I	30	NC	-
31	PDA1-P3N	O	32	NC	-
33	PDA0-P3P	O	34	PDA2-P3N	O
35	PDCS1-P3N	O	36	PDCS3-P3N	O
37	NC	-	38	SB-P5V	-
39	P5V	-	40	P5V	-
41	P5V	-	42	P5V	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	NC	-	48	GND	-
49	NC	-	50	NC	I

C.5 CN2300 Docking interface connector (240-pin)*Table C-5 Docking interface connector (240-pin) (1/4)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	DSKDC	-	A2	GND	-
A2			A4		
1	DCOUT	-	2	DCOUT	-
3	DOCDT1-S3N	I	4	IF-P5V	-
5	EXMSCK-P5P	I/O	6	EXKBCK-P5P	I/O
7	GND	-	8	(PHYRST-E3N)	O
9	DPCONF-S5P	I	10	GND	-
11	GND	-	12	IDSCL-P5P	I/O
13	DRED-PXP	O	14	DGREEN-PXP	O
15	DBLUE-PXP	O	16	DVSYNC-P5P	O
17	NC	-	18	NC	-
19	GND	-	20	NC	-
21	NC	-	22	NC	-
23	NC	-	24	NC	-
25	NC	-	26	NC	-
27	NC	-	28	GND	-
29	GND	-	30	NC	-
31	NC	-	32	NC	-
33	NC	-	34	NC	-
35	NC	-	36	NC	-
37	GND	-	38	NC	-
39	NC	-	40	NC	-
41	GND	-	42	NC	-
43	NC	-	44	NC	-
45	GND	-	46	NC	-
47	NC	-	48	NC	-
49	GND	-	50	NC	-
51	NC	-	52	NC	-
53	Not Mount	-	54	Not Mount	-
55	ZBIDDP-EXP	O	56	ZBIDDN-EXN	O
57	Not Mount	-	58	Not Mount	-
59	NC	-	60	NC	-
61	DCOUT	-	62	DCOUT	-
63	EJCTRQ-S3N	I/O	64	IF-P5V	-
65	EXMSDT-P5P	I/O	66	EXKBDT-P5P	I/O
67	GND	-	68	GND	-

Table C-5 Docking interface connector (240-pin) (2/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	DILSON-E3P	O	70	NC	-
71	GND	-	72	IDSDA-P5P	I/O
73	GND	-	74	GND	-
75	GND	-	76	DHSYNC-P5P	O
77	NC	-	78	NC	-
79	GND	-	80	NC	-
81	NC	-	82	NC	-
83	NC	-	84	NC	-
85	NC	-	86	NC	-
87	NC	-	88	GND	-
89	GND	-	90	NC	-
91	NC	-	92	NC	-
93	NC	-	94	NC	-
95	NC	-	96	NC	-
97	GND	-	98	NC	-
99	NC	-	100	NC	-
101	GND	-	102	NC	-
103	NC	-	104	NC	-
105	GND	-	106	NC	-
107	NC	-	108	NC	-
109	GND	-	110	NC	-
111	NC	-	112	NC	-
113	Not Mount	-	114	Not Mount	-
115	ZBIDCN-EXN	-	116	Not Mount	-
117	ZBIDCP-EXP	-	118	Not Mount	-
119	Not Mount	-	120	Not Mount	-
121	DCOUT	-	122	DCOUT	-
123	DSSCL-S5P	I/O	124	IF-P5V	-
125	(M5V)	-	126	ZTPA1-P3P	I/O
127	GND	-	128	ZTPB1-P3P	I/O
129	NC	-	130	NC	-
131	GND	-	132	NC	-
133	NC	-	134	SNDMUT-S3N	O
135	NC	-	136	NC	-
137	NC	-	138	NC	-
139	GND	-	140	PWRSW-S3N	O
141	DCD-PYP	I	142	DSR-PYP	I

Table C-5 Docking interface connector (240-pin) (3/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
143	TXD-PYN	O	144	RING-PYP	I
145	PE-P5P	I	146	PDB07-P5P	I/O
147	PDB06-P5P	I/O	148	GND	-
149	GND	-	150	PDB04-P5P	I/O
151	PDB01-P5P	I/O	152	PDB02-P5P	I/O
153	PDB00-P5P	I/O	154	STROB-P5N	O
155	NC	-	156	NC	-
157	GND	-	158	NC	-
159	NC	-	160	NC	-
161	GND	-	162	NC	-
163	NC	-	164	NC	-
165	GND	-	166	NC	-
167	NC	-	168	NC	-
169	GND	-	170	NC	-
171	NC	-	172	NC	-
173	GND	-	174	Not Mount	-
175	LAN-E3V	-	176	Not Mount	-
177	Not Mount	-	178	NC	-
179	ZBIDAP-EXP	I	180	ZBIDAN-EXN	I
181	DCOUT	-	182	DCOUT	-
183	DSSDA-S5P	I/O	184	IF-P5V	-
185	NC	-	186	ZTPA1-P3N	I/O
187	GND	-	188	ZTPB1-P3N	I/O
189	USBP2-S3P	I/O	190	USBP2-S3N	I/O
191	GND	-	192	NC	-
193	NC	-	194	NC	-
195	NC	-	196	NC	-
197	NC	-	198	NC	-
199	GND	-	200	RXD-PYN	I
201	RTS-EYP	O	202	CTS-PYP	I
203	DTR-EYP	O	204	SELCT-P5P	I
205	BUSY-P5P	I	206	ACK-P5N	I
207	PDB05-P5P	I/O	208	GND	-
209	GND	-	210	PDB03-P5P	I/O
211	SLIN-P5N	O	212	PINIT-P5N	O
213	ERROR-P5N	I	214	AUTFD-P5N	O
215	NC	-	216	NC	-

Table C-5 Docking interface connector (240-pin) (4/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
217	GND	-	218	NC	-
219	NC	-	220	NC	-
221	GND	-	222	NC	-
223	NC	-	224	NC	-
225	GND	-	226	NC	-
227	NC	-	228	NC	-
229	GND	-	230	NC	-
231	NC	-	232	NC	-
233	GND	-	234	ACT-E3N	I
235	LINK-E3N	I	236	DOCDT2-S3N	I
237	Not mounted	-	238	Not mounted	-
239	ZBIDBP-EXP	O	240	ZBIDBN-EXN	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-
7T	GND	-	8T	GND	-
9T	GND	-	10T	GND	-
11T	GND	-	12T	GND	-
13T	GND	-	14T	GND	-
15T	GND	-	16T	GND	-

C.6 CN2110 PC card interface connector (68-pin)*Table C-6 PC card interface connector (68-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ACAD00-EYP	I/O
3	ACAD01-PYP	I/O	4	ACAD03-PYP	I/O
5	ACAD05-PYP	I/O	6	ACAD07-PYP	I/O
7	ACCBEO-PYN	I/O	8	ACAD09-PYP	I/O
9	ACAD11-PYP	I/O	10	ACAD12-PYP	I/O
11	ACAD14-PYP	I/O	12	ACCBE1-PYN	I/O
13	ACPAR-PYP	I/O	14	ACPERR-PYN	I/O
15	ACGNT-PYN	I/O	16	ACINT-PYN	I/O
17	MCVCCA-PYV	I/O	18	MCVPPA-PYV	I/O
19	ACCLK-PYP	I/O	20	ACIRDY-PYN	I/O
21	ACCBE2-PYN	I/O	22	ACAD18-PYP	I/O
23	ACAD20-PYP	I/O	24	ACAD21-PYP	I/O
25	ACAD22-PYP	I/O	26	ACAD23-PYP	I/O
27	ACAD24-PYP	I/O	28	ACAD25-PYP	I/O
29	ACAD26-PYP	I/O	30	ACAD27-PYP	I/O
31	ACAD29-PYP	I/O	32	ACD02-PYP	I/O
33	ACCLKR-PYN	I/O	34	GND	-
35	GND	-	36	ACCD1-P3N	I/O
37	ACAD02-PYP	I/O	38	ACAD04-PYP	I/O
39	ACAD06-PYP	I/O	40	ACD14-PYP	I/O
41	ACAD08-PYP	I/O	42	ACAD10-PYP	I/O
43	ACVS1-P3P	I/O	44	ACD13-PYP	I/O
45	ACD15-PYP	I/O	46	ACD16-PYP	I/O
47	ACA18-PYP	I/O	48	ACLOCK-PYP	I/O
49	ACSTOP-PYP	I/O	50	ACDEVS-PYP	I/O
51	MCVPPA-PYV	-	52	MCVPPA-PYV	-
53	ACTRDY-PYN	I/O	54	ACFRAM-PYN	I/O
55	ACD17-PYP	I/O	56	ACD19-PYP	I/O
57	ACVS2-P3P	I/O	58	ACRST-PYN	I/O
59	ACSERR-PYN	I/O	60	ACREQ-PYN	I/O
61	ACCBE3-PYN	I/O	62	ACAUDI-PYP	I
63	ACSTSC-PYP	I	64	ACD28-PYP	I/O
65	ACD30PYP	I/O	66	ACD31-PYP	I/O
67	ACCD2-P3N	-	68	GND	-
1T	GND	-	2T	GND	-

C.7 CN2600 Wireless LAN card interface connector (52-pin)

Table C-7 Wireless LAN card interface connector (52-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PEWAKE-E3N	I	2	P3V	-
3	WCHDAT-P3P	O	4	GND	-
5	WCHCLK-P3P	O	6	1R5-P1V	-
7	MPEXRQ-P3N	I	8	NC	-
9	GND	-	10	NC	-
11	XPEWL-P3N	O	12	NC	-
13	XPEWL-P3P	O	14	NC	-
15	GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	(WLRFON-S3N)	O
21	GND	-	22	PLTRS1-E3N	-
23	ZPERWL-P1N	I	24	E3V	-
25	ZPERWL-P1P	I	26	GND	-
27	GND	-	28	1R5-P1V	-
29	GND	-	30	NC	-
31	ZPETWL-P1N	O	32	NC	-
33	ZPETWL-P1P	O	34	GND	-
35	GND	-	36	NC	-
37	NC	-	38	NC	-
39	NC	-	40	GND	-
41	NC	-	42	NC	-
43	NC	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	1R5-P1V	-
49	NC	-	50	GND	-
51	NC	-	52	P3V	-
1T	GND	-	2T	GND	-

C.8 CN3010 MDC interface connector (12-pin)*Table C-8 MDC interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	ACZOT1-P3P	I/O	4	NC	-
5	GND	-	6	E3V	-
7	ACZSY1-P3P	O	8	GND	-
9	ACZIN1-E3P	I/O	10	GND	-
11	ACZRS1-E3N	O	12	XAZBC1-P3P	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.9 CN3011 MDC relay connector (4-pin)*Table C-9 MDC relay connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MDMRING-E3P	I/O	2	MDMRING-E3P	I/O
3	MDMTIP-E3P	I/O	4	MDMTIP-E3P	I/O

C.10 CN3200 Keyboard interface connector (34-pin)*Table C-10 Keyboard interface connector (34-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NUMLED-P5N	I	2	ARWLED-P5N	I
3	CAPLED-P5N	I	4	P5V	I
5	KBSC00-S3N	O	6	KBSC01-S3N	O
7	KBSC02-S3N	O	8	KBSC03-S3N	O
9	KBSC04-S3N	O	10	KBSC05-S3N	O
11	KBSC06-S3N	O	12	KBRT00-S3N	O
13	KBSC07-S3N	O	14	KBSC08-S3N	O
15	KBSC09-S3N	O	16	KBRT01-S3N	O
17	KBRT02-S3N	O	18	KBRT03-S3N	O
19	KBSC10-S3N	O	20	KBSC11-S3N	O
21	KBRT04-S3N	O	22	KBRT05-S3N	O
23	KBSC12-S3N	O	24	KBSC13-S3N	O
25	KBRT06-S3N	O	26	KBRT07-S3N	O
27	KBSC14-S3N	O	28	KBSC15-S3N	O
29	NC	-	30	SP-P5V	-
31	SPX-PXP	-	32	SP-GND	-
33	SPY-PXP	-	34	NC	-
1T	GND	-	2T	GND	-

C.11 CN3240 PAD interface connector (8-pin)*Table C-11 PAD interface connector (8-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SP-P5V	-	2	SPX-PXP	-
3	SPY-PXP	-	4	SP-GND	-
5	GND	-	6	IPDCLK-P5P	I/O
7	IPDDAT-P5P	I/O	8	P5V	I
1T	GND	-	2T	GND	-

C.12 CN9721 SW membrane interface connector (13-pin)*Table C-12 SW membrane interface connector (13-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PNLOFF-S3N	I	2	NC	-
3	NC	-	4	GND	-
5	NC	-	6	NC	-
7	PWRSW-S3N	I	8	NC	-
9	NC	-	10	GPBTNA-S3N	I
11	NC	-	12	NC	-
13	GPBTNB-S3N	I			
1T	GND	-	2T	GND	-

C.13 CN3490 LPC debug port interface connector (12-pin)*Table C-13 LPC debug port interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	P3V	-
3	LPCFRM-P3P		4	DBGDET-P3N	I
5	LAD0-P3P	I/O	6	LAD1-P3P	I/O
7	LAD2-P3P	I/O	8	LAD3-P3P	I/O
9	PLTRS2-E3N	O	10	X33DBG-P3P	
11	P3V	-	12	GND	-

C.14 J4100 LAN interface connector (12-pin)*Table C-14 LAN interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZMDI0P-EYP	I/O	2	ZMDI0N-EYN	I/O
3	ZMDI1P-EYP	I/O	4	ZMDI1P-EYN	I/O
5	ZMDI2P-EYP	I/O	6	ZMDI2P-EYN	I/O
7	ZMDI3P-EYP	I/O	8	ZMDI3P-EYN	I/O
9	LAN-E3V	-	10	LINK-E3N	O
11	LAN-E3V	-	12	ACT-E3N	O
1T	GND	-	2T	GND	-

C.15 CN4200 IEEE 1394 interface connector (4-pin)*Table C-15 IEEE 1394 interface connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZTPB0-P3N	I/O	2	ZTPB0-P3P	I/O
3	ZTPA0-P3N	I/O	4	ZTPA0-P3P	I/O
1T	GND	-	2T	GND	-
2T	GND	-	4T	GND	-

C.16 CN4400 Bluetooth interface connector (20-pin)*Table C-16 Bluetooth interface connector (20-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BT-P3V	-	2	NC	-
3	WCHDAT-P3P	O	4	ZUSBBT-E3N	I/O
5	ZUSBBT-P3P	I/O	6	NC	-
7	WCHCLK-P3P	O	8	GND	-
9	NC	-	10	GND	-
11	NC	-	12	NC	-
13	BTRST-S3N	O	14	NC	-
15	NC	-	16	NC	-
17	NC	-	18	BTMDL-P3N	I
19	NC	-	20	GND	-
1T	GND	-	2T	GND	-

C.17 CN4614 USB 6 connector (4-pin)*Table C-17 USB 6 connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	-	2	ZUSBP6-E3N	I/O
3	ZUSBP6-E3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

C.18 CN4614 USB 4 connector (4-pin)*Table C-18 USB 4 connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	-	2	ZUSBP4-E3N	I/O
3	ZUSBP4-E3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

C.19 CN4614 USB 0 connector (4-pin)*Table C-19 USB 0 connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	-	2	ZUSBP0-E3N	I/O
3	ZUSBP0-E3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

C.20 CN5000 LCD interface connector (40-pin)*Table C-20 LCD interface connector (40-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BRT2DA-S3P	O	2	BRT10-P5P	O
3	Pulled up to FL-P5V	O	4	FL-P5V	-
5	FL-P5V	-	6	FL-P5V	-
7	NC	-	8	GND	-
9	GND	-	10	GND	-
11	P3V	-	12	PNL-P3V	-
13	PNL-P3V	-	14	LCDSDA-P3P	I/O
15	LCDSCL-P3P	I/O	16	GND	-
17	ZTXDA2-PYP	O	18	ZTXDA2-PYN	O
19	GND	-	20	ZTXDA1-PYP	O
21	ZTXDA1-PYN	O	22	GND	-
23	ZTXDA0-PYP	O	24	ZTXDA0-PYN	O
25	GND	-	26	XTXCKA-PYP	O
27	XTXCKA-PYN	O	28	GND	-
29	ZTXDB2-PYN	O	30	ZTXDB2-PYN	O
31	GND	-	32	ZTXDB1-PYN	O
33	ZTXDB1-PYN	O	34	GND	-
35	ZTXDB0-PYN	O	36	ZTXDB0-PYN	O
37	GND	-	38	XTXCKB-PYN	O
39	XTXCKB-PYN	O	40	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.21 CN5080 RGB connector (15-pin)*Table C-21 RGB connector (15-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRED-PXP	O	2	MGRN-PXP	O
3	MBLU-PXP	O	4	NC	-
5	GND	-	6	GND	-
7	GND	-	8	GND	-
9	P5V	-	10	GND	-
11	NC	-	12	CRTSDA-P5P	I/O
13	MHSYNC-P5P	O	14	MVSYNC-P5P	O
15	CRTSCL-P5P	I/O			
1T	GND	-	2T	GND	-

C.22 J6051 External microphone connector (6-pin)*Table C-22 External Microphone connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	MICIN	I
3	(VREF)	-	4	(MICIN)	I
5	DETECT-P4N	I	6	(VREF)	-

C.23 CN6170 Speaker connector (4-pin)*Table C-23 Speaker connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SPOTL-PXN	O	2	SPOTL-PXP	O
3	SPOTR-PXP	-	4	SPOTR-PXN	O

C.24 J6310 Headphone connector (5-pin)*Table C-24 Headphone connector (5-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	HEADL-PXP	O
3	HEADR-PXP	O	4	NC	-
5	A-GND	-			

C.25 CN8800 DC-IN connector (4-pin)*Table C-25 DC-IN connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ADPDC	-	2	ADPDC	-
3	GND	-	4	GND	-

C.26 CN8810 Main Battery connector (10-pin)*Table C-26 Main Battery connector (10-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PVBL1	-	2	BTMP1	I
3	(DCHG)	-	4	M5V	-
5	PSCL-S5P	I/O	6	PSDA-S5P	I/O
7	GND	-	8	DBT10V-S5N	O
9	GND	-	10	GND	-

C.27 CN9300 RTC Battery connector (3-pin)*Table C-27 RTC Battery connector (3-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZS-PWCHKF	O	2	NC	-
3	GND	-			
1T	GND	-	2T	GND	-

C.28 CN8771 FAN interface connector (4-pin)*Table C-28 FAN interface connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	P5V	-	2	FANG0-P3P	I
3	GND	-	4	(FPWM0-S3P)	O

C.29 CN9600 SV board (FHBIR*) interface connector (20-pin)*Table C-29 SV board (FHBIR*) interface connector (20-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ILUMINA-PYP	-
3	ICHROM-PYP	-	4	GND	-
5	GND	-	6	NC	-
7	NC	-	8	NC	-
9	SERDET-P3N	I/O	10	GND	-
11	DCD-PYN	I	12	DSR-PYP	I
13	RXD-PYN	I	14	RTS-PYP	O
15	GND	-	16	TXD-PYN	O
17	CTS-PYP	O	18	DTR-PYP	O
19	RING-PYP	I	20	GND	-
IT	GND	-	2T	GND	-

C.30 CN9700 Fingerprint sensor board (FHBIS*) interface connector (6-pin)*Table C-30 Fingerprint sensor board (FHBIS*) interface connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ZUSBFS-E3P	I/O
3	ZUSBFS-E3N	I/O	4	GND	-
5	FGSPON-S3N	O	6	E3V	-
1T	GND	-	2T	GND	-

C.31 CN9720 SD card board (FHBID*) interface connector (20-pin)*Table C-31 SD card board (FHBID*) interface connector (20-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SD-P3V	-	2	SD-P3V	-
3	SD-P3V	-	4	SD-P3V	-
5	SD-P3V	-	6	SDAT3-P3P	I/O
7	GND	-	8	SDCMD-P3P	I/O
9	GND	-	10	SDCLK-P3P	I/O
11	GND	-	12	SDAT0-P3P	I/O
13	GND	-	14	SDAT1-P3P	I/O
15	GND	-	16	SDAT2-P3P	I/O
17	GND	-	18	SDCD-P3N	I
19	SDWP-P3P	I	20	GND	-
1T	GND	-	2T	GND	-

SV Board (FHBIR*)**C.32 CN9610 System board interface connector (20-pin)***Table C-32 System board interface connector (20-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ILUMINA-PYP	-
3	ICHROM-PYP	-	4	GND	-
5	GND	-	6	NC	-
7	NC	-	8	NC	-
9	SERDET-P3N	I/O	10	GND	-
11	DCD-PYN	O	12	DSR-PYP	O
13	RXD-PYN	O	14	RTS-PYP	I
15	GND	-	16	TXD-PYN	I
17	CTS-PYP	O	18	DTR-PYP	I
19	RING-PYP	O	20	GND	-
IT	GND	-	2T	GND	-

C.33 CN9611 S-Video connector (6-pin)*Table C-33 S-Video connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	A-GND	-
3	ALUMIN-PYP	O	4	ACHROM-PYP	O
5	GND	-	6	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.34 CN5501 Serial interface connector (9-pin)*Table C-34 Serial interface connector (9-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DCD-PYN	I	2	RXD-PYN	I
3	TXD-PYN	O	4	DTR-PYP	O
5	GND	-	6	DSR-PYP	I
7	RTS-PYP	O	8	CTS-PYP	I
9	RING-PYP	I			
1T	GND	-	2T	GND	-

Fingerprint Sensor Board (FHBIS*)

C.35 CN9540 System board interface connector (8-pin)

Table C-35 System board interface connector (8-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	E3V	-	4	FGSPON-S3N	O
5	GND	-	6	ZUSBFS-E3N	I/O
7	ZUSBFS-E3P	I/O	8	GND	-
1T	GND	-	2T	GND	-

SD card Board (FHBID*)**C.36 CN9550 System board interface connector (20-pin)***Table C-36 System board interface connector (20-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SD-P3V	-	2	SD-P3V	-
3	SD-P3V	-	4	SD-P3V	-
5	SD-P3V	-	6	SDAT3-P3P	I/O
7	GND	-	8	SDCMD-P3P	I/O
9	GND	-	10	SDCLK-P3P	I/O
11	GND	-	12	SDAT0-P3P	I/O
13	GND	-	14	SDAT1-P3P	I/O
15	GND	-	16	SDAT2-P3P	I/O
17	GND	-	18	SDCD-P3N	O
19	SDWP-P3P	O	20	GND	-
IT	GND	-	2T	GND	-

C.37 IS2101 SD card interface connector (12-pin)*Table C-37 SD card interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SDAT3-P3P	I/O	2	SDCMD-P3P	I/O
3	GND	-	4	SD-P3V	-
5	SDCLK-P3P	I/O	6	GND	-
7	SDAT0-P3P	I/O	8	SDAT1-P3P	I/O
9	SDAT2-P3P	I/O	10	SDCD-P3N	O
11	GND	-	12	SDWP-P3P	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

[ATI Chipset model]**System board (FHBAS*)**

* The following connectors are different from ones of Intel chipset model.

C.38 CN1400 SO-DIMM 0 connector (200-pin)

Table C-38 SO-DIMM 0 connector (200-pin) (1/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRVREF-B0V	-	2	GND	-
3	GND	-	4	ADQ63-B1P	I/O
5	ADQ59-B1P	I/O	6	ADQ56-B1P	I/O
7	ADQ62-B1P	I/O	8	GND	-
9	GND	-	10	ADM7-B1P	I/O
11	ADQS7-B1N	I/O	12	GND	-
13	ADQS7-B1P	I/O	14	ADQ56-B1P	I/O
15	GND	-	16	ADQ61-B1P	I/O
17	ADQ57-B1P	I/O	18	GND	-
19	ADQ60-B1P	I/O	20	ADQ54-B1P	I/O
21	GND	-	22	ADQ51-B1P	I/O
23	ADQ49-B1P	I/O	24	GND	-
25	ADQ50-B1P	I/O	26	ADM6-B1P	I/O
27	GND	-	28	GND	-
29	ADQS6-B1N	I/O	30	MCK0-B1P	O
31	ADQS6-B1P	I/O	32	MCK0-B1N	O
33	GRD	-	34	GND	-
35	ADQ55-B1P	I/O	36	ADQ53-B1P	I/O
37	ADQ48-B1P	I/O	38	ADQ52-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	ADQ46-B1P	I/O	44	ADQ47-B1P	I/O
45	ADQ42-B1P	-	46	ADQ43-B1P	I/O
47	GND	-	48	GND	-
49	ADQS5-B1N	I/O	50	NC	-
51	ADQS5-B1P	I/O	52	ADM5-B1P	I/O
53	GND	-	54	GND	-
55	ADQ44-B1P	I/O	56	ADQ41-B1P	I/O
57	ADQ45-B1P	I/O	58	ADQ40-B1P	I/O
59	GND	-	60	GND	-

Table C-38 SO-DIMM 0 connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
61	ADQ34-B1P	I/O	62	ADQ38-B1P	I/O
63	ADQ39-B1P	I/O	64	ADQ35-B1P	I/O
65	GND	-	66	GND	-
67	ADM4-B1P	I/O	68	ADQS4-B1N	I/O
69	NC	-	70	ADQS4-B1P	I/O
71	GND	-	72	GND	-
73	ADQ32-B1P	I/O	74	ADQ33-B1P	I/O
75	ADQ36-B1P	I/O	76	ADQ37-B1P	I/O
77	GND	-	78	GND	-
79	MCKE0-B1P	O	80	MCKE1-B1P	O
81	1R8-B1V	-	82	1R8-B1V	-
83	NC	-	84	NC	-
85	ABS2-B1P	O	86	AMA14-B1P	O
87	1R8-B1V	-	88	1R8-B1V	-
89	AMA12-B1P	O	90	AMA11-B1P	O
91	AMA09-B1P	O	92	AMA07-B1P	O
93	AMA08-B1P	O	94	AMA06-B1P	O
95	1R8-B1V	-	96	1R8-B1V	I
97	AMA05-B1P	O	98	AMA04-B1P	O
99	AMA03-B1P	O	100	AMA02-B1P	O
101	AMA01-B1P	O	102	AMA00-B1P	O
103	1R8-B1V	-	104	1R8-B1V	-
105	AMA10-B1P	O	106	ABS1-B1P	O
107	ABS0-B1P	O	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS0-B1N	O
111	1R8-B1V	-	112	1R8-B1V	-
113	ACAS-B1N	O	114	MODT0-B1P	O
115	MCS1-B1N	O	116	AMA13-B1P	I/O
117	1R8-B1V	-	118	1R8-B1V	-
119	MODT2-B1P	O	120	NC	-
121	GND	-	122	GND	-
123	ADQ31-B1P	I/O	124	ADQ27-B1P	I/O
125	ADQ30-B1P	I/O	126	ADQ26-B1P	I/O
127	GND	-	128	GND	-
129	ADQS3-B1N	I/O	130	ADM3-B1P	O
131	ADQS3-B1P	I/O	132	GND	-

Table C-38 SO-DIMM 0 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
133	GND	-	134	ADQ24-B1P	I/O
135	ADQ29-B1P	I/O	136	ADQ25-B1P	I/O
137	ADQ28-B1P	I/O	138	GND	-
139	GND	-	140	ADQ19-B1P	I/O
141	ADQ18-B1P	I/O	142	ADQ23-B1P	I/O
143	ADQ22-B1P	I/O	144	GND	-
145	GND	-	146	ADQS2-B1N	I/O
147	ADM2-B1P	O	148	ADQS2-B1P	I/O
149	GND	-	150	GND	-
151	ADQ16-B1P	I/O	152	ADQ21-B1P	I/O
153	ADQ20-B1P	I/O	154	ADQ17-B1P	I/O
155	GND	-	156	GND	-
157	ADQ06-B1P	I/O	158	ADQ02-B1P	I/O
159	ADQ07-B1P	I/O	160	ADQ03-B1P	I/O
161	GND	-	162	GND	-
163	NC	-	164	XMCK1-B1P	O
165	GND	-	166	XMCK1-B1N	O
167	ADQS0-B1N	I/O	168	GND	-
169	ADQS0-B1P	I/O	170	ADM0-B1P	O
171	GND	-	172	GND	-
173	ADQ00-B1P	I/O	174	ADQ04-B1P	I/O
175	ADQ01-B1P	I/O	176	ADQ05-B1P	I/O
177	GND	-	178	GND	-
179	ADQ14-B1P	I/O	180	ADQ11-B1P	I/O
181	ADQ15-B1P	I/O	182	ADQ10-B1P	I/O
183	GND	-	184	GND	-
185	ADM1-B1P	O	186	ADQS1-B1N	I/O
187	GND	-	188	ADQS1-B1P	I/O
189	ADQ09-B1P	I/O	190	GND	-
191	ADQ12-B1P	I/O	192	ADQ08-B1P	I/O
193	GND	-	194	ADQ13-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCK1-P3P	I/O	198	GND	-
199	P3V	-	200	GND	-
1T	GND	-	2T	GND	-

C.39 CN1410 SO-DIMM 1 connector (200-pin)*Table C-39 SO-DIMM 1 connector (200-pin) (1/3)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	MRVREF-B0V	-	2	GND	-
3	GND	-	4	ADQ63-B1P	I/O
5	ADQ59-B1P	I/O	6	ADQ56-B1P	I/O
7	ADQ62-B1P	I/O	8	GND	-
9	GND	-	10	ADM7-B1P	I/O
11	ADQS7-B1N	I/O	12	GND	-
13	ADQS7-B1P	I/O	14	ADQ56-B1P	I/O
15	GND	-	16	ADQ61-B1P	I/O
17	ADQ57-B1P	I/O	18	GND	-
19	ADQ60-B1P	I/O	20	ADQ54-B1P	I/O
21	GND	-	22	ADQ51-B1P	I/O
23	ADQ49-B1P	I/O	24	GND	-
25	ADQ50-B1P	I/O	26	ADM6-B1P	I/O
27	GND	-	28	GND	-
29	ADQS6-B1N	I/O	30	MCK0-B1P	O
31	ADQS6-B1P	I/O	32	MCK0-B1N	O
33	GRD	-	34	GND	-
35	ADQ55-B1P	I/O	36	ADQ53-B1P	I/O
37	ADQ48-B1P	I/O	38	ADQ52-B1P	I/O
39	GND	-	40	GND	-
41	GND	-	42	GND	-
43	ADQ46-B1P	I/O	44	ADQ47-B1P	I/O
45	ADQ42-B1P	-	46	ADQ43-B1P	I/O
47	GND	-	48	GND	-
49	ADQS5-B1N	I/O	50	NC	-
51	ADQS5-B1P	I/O	52	ADM5-B1P	I/O
53	GND	-	54	GND	-
55	ADQ44-B1P	I/O	56	ADQ41-B1P	I/O
57	ADQ45-B1P	I/O	58	ADQ40-B1P	I/O
59	GND	-	60	GND	-
61	ADQ34-B1P	I/O	62	ADQ38-B1P	I/O

Table C-39 SO-DIMM 1 connector (200-pin) (2/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
63	ADQ39-B1P	I/O	64	ADQ35-B1P	I/O
65	GND	-	66	GND	-
67	ADM4-B1P	I/O	68	ADQS4-B1N	I/O
69	NC	-	70	ADQS4-B1P	I/O
71	GND	-	72	GND	-
73	ADQ32-B1P	I/O	74	ADQ33-B1P	I/O
75	ADQ36-B1P	I/O	76	ADQ37-B1P	I/O
77	GND	-	78	GND	-
79	MCKE0-B1P	O	80	MCKE3-B1P	O
81	1R8-B1V	-	82	1R8-B1V	-
83	NC	-	84	NC	-
85	ABS2-B1P	O	86	AMA14-B1P	O
87	1R8-B1V	-	88	1R8-B1V	-
89	AMA12-B1P	O	90	AMA11-B1P	O
91	AMA09-B1P	O	92	AMA07-B1P	O
93	AMA08-B1P	O	94	AMA06-B1P	O
95	1R8-B1V	-	96	1R8-B1V	I
97	AMA05-B1P	O	98	AMA04-B1P	O
99	AMA03-B1P	O	100	AMA02-B1P	O
101	AMA01-B1P	O	102	AMA00-B1P	O
103	1R8-B1V	-	104	1R8-B1V	-
105	AMA10-B1P	O	106	ABS1-B1P	O
107	ABS0-B1P	O	108	ARAS-B1N	I
109	AWE-B1N	I	110	MCS2-B1N	O
111	1R8-B1V	-	112	1R8-B1V	-
113	ACAS-B1N	O	114	MODT1-B1P	O
115	MCS3-B1N	O	116	AMA13-B1P	I/O
117	1R8-B1V	-	118	1R8-B1V	-
119	MODT3-B1P	O	120	NC	-
121	GND	-	122	GND	-
123	ADQ31-B1P	I/O	124	ADQ27-B1P	I/O
125	ADQ30-B1P	I/O	126	ADQ26-B1P	I/O
127	GND	-	128	GND	-
129	ADQS3-B1N	I/O	130	ADM3-B1P	O
131	ADQS3-B1P	I/O	132	GND	-
133	GND	-	134	ADQ24-B1P	I/O

Table C-39 SO-DIMM 1 connector (200-pin) (3/3)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
135	ADQ29-B1P	I/O	136	ADQ25-B1P	I/O
137	ADQ28-B1P	I/O	138	GND	-
139	GND	-	140	ADQ19-B1P	I/O
141	ADQ18-B1P	I/O	142	ADQ23-B1P	I/O
143	ADQ22-B1P	I/O	144	GND	-
145	GND	-	146	ADQS2-B1N	I/O
147	ADM2-B1P	O	148	ADQS2-B1P	I/O
149	GND	-	150	GND	-
151	ADQ16-B1P	I/O	152	ADQ21-B1P	I/O
153	ADQ20-B1P	I/O	154	ADQ17-B1P	I/O
155	GND	-	156	GND	-
157	ADQ06-B1P	I/O	158	ADQ02-B1P	I/O
159	ADQ07-B1P	I/O	160	ADQ03-B1P	I/O
161	GND	-	162	GND	-
163	NC	-	164	XMCK2-B1P	O
165	GND	-	166	XMCK2-B1N	O
167	ADQS0-B1N	I/O	168	GND	-
169	ADQS0-B1P	I/O	170	ADM0-B1P	O
171	GND	-	172	GND	-
173	ADQ00-B1P	I/O	174	ADQ04-B1P	I/O
175	ADQ01-B1P	I/O	176	ADQ05-B1P	I/O
177	GND	-	178	GND	-
179	ADQ14-B1P	I/O	180	ADQ11-B1P	I/O
181	ADQ15-B1P	I/O	182	ADQ10-B1P	I/O
183	GND	-	184	GND	-
185	ADM1-B1P	O	186	ADQS1-B1N	I/O
187	GND	-	188	ADQS1-B1P	I/O
189	ADQ09-B1P	I/O	190	GND	-
191	ADQ12-B1P	I/O	192	ADQ08-B1P	I/O
193	GND	-	194	ADQ13-B1P	I/O
195	SMBDAT-P3P	I/O	196	GND	-
197	SMBCK1-P3P	I/O	198	GND	-
199	P3V	-	200	GND	-
1T	GND	-	2T	GND	-

C.40 CN1850 HDD interface connector (11-pin)*Table C-40 HDD interface connector (11-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	ZSATT0-P1P	O	2	ZSATT0-P1N	O
3	GND	-	4	ZSATR0-P1N	I
5	ZSATR0-P1P	I	6	GND	-
7	P3V	-	8	GND	-
9	P5V	-	10	GND	-
11	GND	-			
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.41 CN1810 ODD interface connector (50-pin)*Table C-41 ODD interface connector (50-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	NC	-	2	NC	-
3	GND	-	4	NC	-
5	PLTRS0-E3N + RSTTIDB-P3N	O	6	PDD08-P3P	I/O
7	PDD07-P3P	I/O	8	PDD09-P3P	I/O
9	PDD06-P3P	I/O	10	PDD10-P3P	I/O
11	PDD05-P3P	I/O	12	PDD11-P3P	I/O
13	PDD04-P3P	I/O	14	PDD12-P3P	I/O
15	PDD03-P3P	I/O	16	PDD13-P3P	I/O
17	PDD02-P3P	I/O	18	PDD14-P3P	I/O
19	PDD01-P3P	I/O	20	PDD15-P3P	I/O
21	PDD00-P3P	I/O	22	PDDREQ-P3P	I
23	GND	-	24	PDIOR-P3N	O
25	PDIOW-P3N	O	26	GND	-
27	PIORDY-P3P	I	28	PDDACK	
29	IDEIRQ-P3P	I	30	NC	-
31	PDA1-P3N	O	32	NC	-
33	PDA0-P3P	O	34	PDA2-P3N	O
35	PDCS1-P3N	O	36	PDCS3-P3N	O
37	NC	-	38	P5V	-
39	P5V	-	40	P5V	-
41	P5V	-	42	P5V	-
43	GND	-	44	GND	-
45	GND	-	46	GND	-
47	NC	-	48	NC	-
49	NC	-	50	NC	-

C.42 CN3200 Docking interface connector (240-pin)*Table C-42 Docking interface connector (240-pin) (1/4)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
A1	DSKDC	-	A2	GND	-
A2			A4		
1	DCOUT	-	2	DCOUT	-
3	DOCDT1-S3N	I	4	IF-P5V	-
5	EXMSCK-P5P	I/O	6	EXKBCK-P5P	I/O
7	GND	-	8	(PHYRST-E3N)	O
9	DPCONF-S5P	I	10	GND	-
11	GND	-	12	IDSCL-P5P	I/O
13	DRED-PXP	O	14	DGREEN-PXP	O
15	DBLUE-PXP	O	16	DVSYNC-P5P	O
17	NC	-	18	NC	-
19	GND	-	20	NC	-
21	NC	-	22	NC	-
23	NC	-	24	NC	-
25	NC	-	26	NC	-
27	NC	-	28	GND	-
29	GND	-	30	NC	-
31	NC	-	32	NC	-
33	NC	-	34	NC	-
35	NC	-	36	NC	-
37	GND	-	38	NC	-
39	NC	-	40	NC	-
41	GND	-	42	NC	-
43	NC	-	44	NC	-
45	GND	-	46	NC	-
47	NC	-	48	NC	-
49	GND	-	50	NC	-
51	NC	-	52	NC	-
53	Not Mount	-	54	Not Mount	-
55	ZBIDDP-EXP	O	56	ZBIDDN-EXN	O
57	Not Mount	-	58	Not Mount	-
59	NC	-	60	NC	-
61	DCOUT	-	62	DCOUT	-
63	EJCTRQ-S3N	I/O	64	IF-P5V	-
65	EXMSDT-P5P	I/O	66	EXKBDT-P5P	I/O
67	GND	-	68	GND	-

Table C-42 Docking interface connector (240-pin) (2/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
69	DILSON-E3P	O	70	NC	-
71	GND	-	72	ADSDA-P5P	I/O
73	GND	-	74	GND	-
75	GND	-	76	DHSYNC-P5P	O
77	NC	-	78	NC	-
79	GND	-	80	NC	-
81	NC	-	82	NC	-
83	NC	-	84	NC	-
85	NC	-	86	NC	-
87	NC	-	88	GND	-
89	GND	-	90	NC	-
91	NC	-	92	NC	-
93	NC	-	94	NC	-
95	NC	-	96	NC	-
97	GND	-	98	NC	-
99	NC	-	100	NC	-
101	GND	-	102	NC	-
103	NC	-	104	NC	-
105	GND	-	106	NC	-
107	NC	-	108	NC	-
109	GND	-	110	NC	-
111	NC	-	112	NC	-
113	Not Mount	-	114	Not Mount	-
115	ZBIDCN-EXN	-	116	Not Mount	-
117	ZBIDCP-EXP	-	118	Not Mount	-
119	Not Mount	-	120	Not Mount	-
121	DCOUT	-	122	DCOUT	-
123	DSSCL-S5P	I/O	124	IF-P5V	-
125	(M5V)	-	126	ZTPA1-P3P	I/O
127	GND	-	128	ZTPB1-P3P	I/O
129	NC	-	130	NC	-
131	GND	-	132	NC	-
133	NC	-	134	SNDMUT-S3N	O
135	NC	-	136	NC	-
137	NC	-	138	NC	-
139	GND	-	140	PWRSW-S3N	O
141	DCD-PYP	I	142	DSR-PYP	I

Table C-42 Docking interface connector (240-pin) (3/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
143	TXD-PYN	O	144	RING-PYP	I
145	PE-P5P	I	146	PDB07-P5P	I/O
147	PDB06-P5P	I/O	148	GND	-
149	GND	-	150	PDB04-P5P	I/O
151	PDB01-P5P	I/O	152	PDB02-P5P	I/O
153	PDB00-P5P	I/O	154	STROB-P5N	O
155	NC	-	156	NC	-
157	GND	-	158	NC	-
159	NC	-	160	NC	-
161	GND	-	162	NC	-
163	NC	-	164	NC	-
165	GND	-	166	NC	-
167	NC	-	168	NC	-
169	GND	-	170	NC	-
171	NC	-	172	NC	-
173	GND	-	174	Not Mount	-
175	LAN-E3V	-	176	Not Mount	-
177	Not Mount	-	178	NC	-
179	ZBIDAP-EXP	I	180	ZBIDAN-EXN	I
181	DCOUT	-	182	DCOUT	-
183	DSSDA-S5P	I/O	184	IF-P5V	-
185	NC	-	186	ZTPA1-P3N	I/O
187	GND	-	188	ZTPB1-P3N	I/O
189	ZUSBDC-E3P	I/O	190	ZUSBDC-E3P	I/O
191	GND	-	192	NC	-
193	NC	-	194	NC	-
195	NC	-	196	NC	-
197	NC	-	198	NC	-
199	GND	-	200	RXD-PYN	I
201	RTS-EYP	O	202	CTS-PYP	I
203	DTR-EYP	O	204	SELCT-P5P	I
205	BUSY-P5P	I	206	ACK-P5N	I
207	PDB05-P5P	I/O	208	GND	-
209	GND	-	210	PDB03-P5P	I/O
211	SLIN-P5N	O	212	PINIT-P5N	O
213	ERROR-P5N	I	214	AUTFD-P5N	O
215	NC	-	216	NC	-

Table C-42 Docking interface connector (240-pin) (4/4)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
217	GND	-	218	NC	-
219	NC	-	220	NC	-
221	GND	-	222	NC	-
223	NC	-	224	NC	-
225	GND	-	226	NC	-
227	NC	-	228	NC	-
229	GND	-	230	NC	-
231	NC	-	232	NC	-
233	GND	-	234	ACT-E3N	I
235	LINK-E3N	I	236	DOCDT2-S3N	I
237	Not mounted	-	238	Not mounted	-
239	ZBIDBP-EXP	O	240	ZBIDBN-EXN	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-
7T	GND	-	8T	GND	-
9T	GND	-	10T	GND	-
11T	GND	-	12T	GND	-
13T	GND	-	14T	GND	-
15T	GND	-	16T	GND	-

C.43 CN2600 Wireless LAN card interface connector (52-pin)*Table C-43 Wireless LAN card interface connector (52-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	PEWAKE-E3N	I	2	P3V	-
3	WCHDAT-P3P	O	4	GND	-
5	WCHCLK-P3P	O	6	1R5-P1V	-
7	MPEXRQ-P3N	I	8	NC	-
9	GND	-	10	NC	-
11	XPEMPE-P3N	O	12	NC	-
13	XPEMPE-P3P	O	14	NC	-
15	GND	-	16	NC	-
17	NC	-	18	GND	-
19	NC	-	20	(WLRFON-S3N)	O
21	GND	-	22	PLTRS3-E3N	-
23	ZPERWL-P1N	I	24	E3V	-
25	ZPERWL-P1P	I	26	GND	-
27	GND	-	28	1R5-P1V	-
29	GND	-	30	NC	-
31	ZPETWL-P1N	O	32	NC	-
33	ZPETWL-P1P	O	34	GND	-
35	GND	-	36	NC	-
37	NC	-	38	NC	-
39	NC	-	40	GND	-
41	NC	-	42	NC	-
43	NC	-	44	NC	-
45	NC	-	46	NC	-
47	NC	-	48	1R5-P1V	-
49	NC	-	50	GND	-
51	NC	-	52	P3V	-
1T	GND	-	2T	GND	-

C.44 CN3490 LPC debug port interface connector (12-pin)*Table C-44 LPC debug port interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	P3V	-
3	LPCFRM-P3P		4	DBGDET-P3N	I
5	LAD0-P3P	I/O	6	LAD1-P3P	I/O
7	LAD2-P3P	I/O	8	LAD3-P3P	I/O
9	PLTRS1-S3N	O	10	X33DBG-P3P	
11	P3V	-	12	GND	-

C.45 J4100 LAN interface connector (12-pin)*Table C-45 LAN interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	TDP-E3P	I/O	2	TDN-E3P	I/O
3	PDP-E3P	I/O	4	ZBIDCP-EXP	I/O
5	ZBIDCP-EXN	I/O	6	RDN-E3N	I/O
7	ZBIDDP-EXP	I/O	8	ZBIDDP-EXN	I/O
9	LAN-E3V	-	10	LINK-E3N	O
11	LAN-E3V	-	12	LACT-E3N	O
1T	GND	-	2T	GND	-

C.46 CN4610 USB 3 port connector (4-pin)*Table C-46 USB 3 port connector (4-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	-	2	ZUSBP3-E3N	I/O
3	ZUSBP3-E3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

C.47 CN4611 USB 4 port connector (4-pin)

Table C-47 USB 4 port connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB1PS-E5V	-	2	ZUSBP1-E3N	I/O
3	ZUSBP1-E3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

C.48 CN4612 USB 0 port connector (4-pin)

Table C-48 USB 0 port connector (4-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	USB0PS-E5V	-	2	ZUSBP0-E3N	I/O
3	ZUSBP0-E3P	I/O	4	GND	-
1T	GND	-	2T	GND	-
3T	GND	-			

C.49 CN5000 LCD interface connector (40-pin)*Table C-49 LCD interface connector (40-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	BRT2DA-S3P	O	2	BRT10-P5P	O
3	Pulled up to FL-P5V	O	4	FL-P5V	-
5	FL-P5V	-	6	FL-P5V	-
7	NC	-	8	GND	-
9	GND	-	10	GND	-
11	P3V	-	12	PNL-P3V	-
13	PNL-P3V	-	14	LCDSDT-P3P	I/O
15	SMBCK2-P3P	I/O	16	GND	-
17	ZTXDA2-PYP	O	18	ZTXDA2-PYN	O
19	GND	-	20	ZTXDA1-PYP	O
21	ZTXDA1-PYN	O	22	GND	-
23	ZTXDA0-PYP	O	24	ZTXDA0-PYN	O
25	GND	-	26	XTXCKA-PYP	O
27	XTXCKA-PYN	O	28	GND	-
29	NC	-	30	NC	-
31	GND	-	32	ZTXDB1-PYN	O
33	NC	-	34	GND	-
35	NC	-	36	NC	-
37	GND	-	38	NC	-
39	NC	-	40	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-
5T	GND	-	6T	GND	-

C.50 CN9600 SV board (FHBAR*) interface connector (20-pin)*Table C-50 SV board (FHBAR*) interface connector (20-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ALUMIN-PYP	-
3	ACHROM-PYP	-	4	GND	-
5	GND	-	6	NC	-
7	NC	-	8	NC	-
9	SERDET-P3N	I/O	10	GND	-
11	DCD-PYN	I	12	DSR-PYP	I
13	RXD-PYN	I	14	RTS-PYP	O
15	GND	-	16	TXD-PYN	O
17	CTS-PYP	O	18	DTR-PYP	O
19	RING-PYP	I	20	GND	-
1T	GND	-	2T	GND	-

C.51 CN9700 Fingerprint sensor board (FHBAS*) interface connector (6-pin)*Table C-51 Fingerprint sensor board (FHBAS*) interface connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ZUSBFS-E3P	I/O
3	ZUSBFS-E3N	I/O	4	GND	-
5	FGSPON-S3N	O	6	E3V	-
1T	GND	-	2T	GND	-

C.52 CN9720 SD card board (FHBAD*) interface connector (20-pin)

Table C-52 SD card board (FHBAD*) interface connector (20-pin)

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SD-P3V	-	2	SD-P3V	-
3	SD-P3V	-	4	SD-P3V	-
5	SD-P3V	-	6	SDAT3-P3P	I/O
7	GND	-	8	SDCMD-P3P	I/O
9	GND	-	10	SDCLK-P3P	I/O
11	GND	-	12	SDAT0-P3P	I/O
13	GND	-	14	SDAT1-P3P	I/O
15	GND	-	16	SDAT2-P3P	I/O
17	GND	-	18	SDCD-P3N	I
19	SDWP-P3P	I	20	GND	-
IT	GND	-	2T	GND	-

SV Board (FHBAR*)**C.53 CN9610 System board interface connector (20-pin)***Table C-53 System board interface connector (20-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	ALUMIN-PYP	-
3	ACHROM-PYP	-	4	GND	-
5	GND	-	6	NC	-
7	NC	-	8	NC	-
9	SERDET-P3N	I/O	10	GND	-
11	DCD-PYN	O	12	DSR-PYP	O
13	RXD-PYN	O	14	RTS-PYP	I
15	GND	-	16	TXD-PYN	I
17	CTS-PYP	O	18	DTR-PYP	I
19	RING-PYP	O	20	GND	-
1T	GND	-	2T	GND	-

C.54 CN9611 S-Video connector (6-pin)*Table C-54 S-Video connector (6-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	A-GND	-	2	A-GND	-
3	ALUMIN-PYP	O	4	ACHROM-PYP	O
5	GND	-	6	GND	-
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

C.55 CN5501 Serial interface connector (9-pin)*Table C-55 Serial interface connector (9-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	DCD-PYN	I	2	RXD-PYN	I
3	TXD-PYN	O	4	DTR-PYP	O
5	GND	-	6	DSR-PYP	I
7	RTS-PYP	O	8	CTS-PYP	I
9	RING-PYP	I			
1T	GND	-	2T	GND	-

Fingerprint Sensor Board (FHBAS*)**C.56 CN9540 System board interface connector (8-pin)***Table C-56 System board interface connector (8-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	GND	-	2	NC	-
3	E3V	-	4	FGSPON-S3N	O
5	GND	-	6	ZUSBFS-E3N	I/O
7	ZUSBFS-E3P	I/O	8	GND	-
1T	GND	-	2T	GND	-

SD Card Board (FHBAD*)**C.57 CN9730 System board interface connector (20-pin)***Table C-57 System board interface connector (20-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SD-P3V	-	2	SD-P3V	-
3	SD-P3V	-	4	SD-P3V	-
5	SD-P3V	-	6	SDAT3-P3P	I/O
7	GND	-	8	SDCMD-P3P	I/O
9	GND	-	10	SDCLK-P3P	I/O
11	GND	-	12	SDAT0-P3P	I/O
13	GND	-	14	SDAT1-P3P	I/O
15	GND	-	16	SDAT2-P3P	I/O
17	GND	-	18	SDCD-P3N	O
19	SDWP-P3P	O	20	GND	-
IT	GND	-	2T	GND	-

C.58 IS2101 SD card interface connector (12-pin)*Table C-58 SD card interface connector (12-pin)*

Pin No.	Signal Name	I/O	Pin No.	Signal Name	I/O
1	SDAT3-P3P	I/O	2	SDCMD-P3P	I/O
3	GND	-	4	SD-P3V	-
5	SDCLK-P3P	I/O	6	GND	-
7	SDAT0-P3P	I/O	8	SDAT1-P3P	I/O
9	SDAT2-P3P	I/O	10	SDCD-P3N	O
11	GND	-	12	SDWP-P3P	O
1T	GND	-	2T	GND	-
3T	GND	-	4T	GND	-

Appendix D Keyboard Scan/Character Codes

Table D-1 Scan codes (set 1 and set 2) (1/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
01	' ~	29	A9	0E	F0	0E	
02	1 !	02	82	16	F0	16	
03	2 @	03	83	1E	F0	1E	
04	3 #	04	84	26	F0	26	
05	4 \$	05	85	25	F0	25	
06	5 %	06	86	2E	F0	2E	
07	6 ^	07	87	36	F0	36	
08	7 &	08	88	3D	F0	3D	*1
09	8 *	09	89	3E	F0	3E	*1
10	9 (0A	8A	46	F0	46	*1
11	0)	0B	8B	45	F0	45	*1
12	- _	0C	8C	4E	F0	4E	
13	= +	0D	8D	55	F0	55	
15	BkSp	0E	8E	66	F0	66	
16	Tab	0F	8F	0D	F0	0D	
17	Q	10	90	15	F0	15	
18	W	11	91	1D	F0	1D	
19	E	12	92	24	F0	24	
20	R	13	93	2D	F0	2D	
21	T	14	94	2C	F0	2C	
22	Y	15	95	35	F0	35	
23	U	16	96	3C	F0	3C	*1
24	I	17	97	43	F0	43	*1
25	O	13	98	44	F0	44	*1
26	P	19	99	4D	F0	4D	*1
27	[{	1A	9A	54	F0	54	
28] }	1B	9B	5B	F0	5B	

Table D-1 Scan codes (set 1 and set 2) (2/4)

Cap No.	Keytop	Code set 1		Code set 2			Note
		Make	Break	Make	Break		
29	\	2B	AB	5D	F0	5D	*2
30	Caps Lock	3A	BA	58	F0	58	
31	A	1E	9E	1C	F0	1C	
32	S	1F	9F	1B	F0	1B	
33	D	20	A0	23	F0	23	
34	F	21	A1	2B	F0	2B	
35	G	22	A2	34	F0	34	
36	H	23	A3	33	F0	33	
37	J	24	A4	3B	F0	3B	*1
38	K	25	A5	42	F0	42	*1
39	L	26	A6	4B	F0	4B	*1
40	; :	27	A7	4C	F0	4C	*1
41	' "	28	A8	52	F0	52	
43	Enter	1C	9C	5A	F0	5A	*3
44	Shift (L)	2A	AA	12	F0	12	
45	No.102 key	56	D6	61	F0	61	
46	Z	2C	AC	1A	F0	1A	
47	X	2D	AD	22	F0	22	
48	C	2E	AE	21	F0	21	
49	V	2F	AF	2A	F0	2A	
50	B	30	B0	32	F0	32	
51	N	31	B1	31	F0	31	
52	M	32	B2	3A	F0	3A	*1
53	, <	33	B3	41	F0	41	*1
54	. >	34	B4	49	F0	49	*1
55	/ ?	35	B5	4A	F0	4A	*1
57	Shift (R)	36	B6	59	F0	59	

Table D-1 Scan codes (set 1 and set 2) (3/4)

Cap No.	Keytop	Code set 1		Code set 2		Note	
		Make	Break	Make	Break		
58	Ctrl	1D	9D	14	F0	14	*3
60	Alt (L)	38	B8	11	F0	11	*3
61	Space	39	B9	29	F0	29	
62	ALT (R)	E0 38	E0 B8	E0 11	E0 F0	11	
75	Ins	E0 52	E0 D2	E0 70	E0 F0	70	*4
76	Del	E0 53	E0 D3	E0 71	E0 F0	71	*4
79	←	E0 4B	E0 CB	E0 6B	E0 F0	6B	*4
80	Home	E0 47	E0 C7	E0 6C	E0 F0	6C	*4
81	End	E0 4F	E0 CF	E0 69	E0 F0	69	*4
83	↑	E0 48	E0 C8	E0 75	E0 F0	75	*4
84	↓	E0 50	E0 D0	E0 72	E0 F0	72	*4
85	PgUp	E0 49	E0 C9	E0 7D	E0 F0	7D	*4
86	PgDn	E0 51	E0 D1	E0 7A	E0 F0	7A	*4
89	→	E0 4D	E0 CD	E0 74	E0 F0	74	*4
110	Esc	01	81	76	F0	76	
112	F1	3B	BB	05	F0	05	
113	F2	3C	BC	06	F0	06	
114	F3	3D	BD	04	F0	04	
115	F4	3E	BE	0C	F0	0C	
116	F5	3F	BF	03	F0	03	
117	F6	40	C0	0B	F0	0B	
118	F7	41	C1	83	F0	83	
119	F8	42	C2	0A	F0	0A	
120	F9	43	C3	01	F0	01	
121	F10	44	C4	09	F0	09	*3

Table D-1 Scan codes (set 1 and set 2) (4/4)

Cap No.	Keytop	Code set 1				Code set 2				Note
		Make		Break		Make		Break		
122	F11	57		D7		78		F0	78	*3
123	F12	58		D8		07		F0	07	*3
124	PrintSc	Refer to table 2-25								
126	Pause	Refer to table 2-25								
202	Fn									*5
203	Win	E0	5B	E0	DB	E0	1F	E0	F0	1F
204	App	E0	5D	E0	DD	E0	2F	E0	F0	2F

Notes:

1. * Scan codes differ by overlay function.
2. * This key corresponds to key No. 42 in the 102 key mode.
3. * Combination with the **Fn** key makes different codes.
4. * Scan codes differ by mode.
5. * The Fn key does not generate a code by itself..

Table D-2 Scan codes with left Shift key

Cap No.	Key top	Code set 1		Code set 2			
		Make	Break	Make		Break	
55	/	E0 AA E0 35	E0 B5 E0 2A	E0 F0 12 E0 4A	E0 F0 4A E0 12		
75	INS	E0 AA E0 52	E0 D2 E0 2A	E0 F0 12 E0 70	E0 F0 70 E0 12		
76	DEL	E0 AA E0 53	E0 D3 E0 2A	E0 F0 12 E0 71	E0 F0 71 E0 12		
79	←	E0 AA E0 4B	E0 CB E0 2A	E0 F0 12 E0 6B	E0 F0 6B E0 12		
80	Home	E0 AA E0 47	E0 C7 E0 2A	E0 F0 12 E0 6C	E0 F0 6C E0 12		
81	End	E0 AA E0 4F	E0 CF E0 2A	E0 F0 12 E0 69	E0 F0 69 E0 12		
83	↑	E0 AA E0 48	E0 C8 E0 2A	E0 F0 12 E0 75	E0 F0 75 E0 12		
84	↓	E0 AA E0 50	E0 D0 E0 2A	E0 F0 12 E0 72	E0 F0 72 E0 12		
85	PgUp	E0 AA E0 49	E0 C9 E0 2A	E0 F0 12 E0 7D	E0 F0 7D E0 12		
86	PgDn	E0 AA E0 51	E0 D1 E0 2A	E0 F0 12 E0 7A	E0 F0 7A E0 12		
89	→	E0 AA E0 4D	E0 CD E0 2A	E0 F0 12 E0 74	E0 F0 74 E0 12		
203	Win	E0 AA E0 5B	E0 DB E0 2A	E0 F0 12 E0 1F	E0 F0 1F E0 12		
204	App	E0 AA E0 5D	E0 DD E0 2A	E0 F0 12 E0 2F	E0 F0 2F E0 12		

Note : The table above shows scan codes with the left **Shift** key.
In the case of Key no. 55 Overlay mode only.

In combination with the right **Shift** key, scan codes are changed as listed below:

	With left Shift	With right Shift
Set 1	E0 AA _____	E0 B6
	E0 2A _____	E0 36
Set 2	E0 F0 12 _____	E0 F0 59
	E0 12 _____	E0 59

Table D-3 Scan codes in Numlock mode

Cap No.	Key top	Code set 1				Code set 2			
		Make		Break		Make		Break	
75	INS	E0 2A	E0 52	E0 D2	E0 AA	E0 12	E0 70	E0 F0	70 E0 F0 12
76	DEL	E0 2A	E0 53	E0 D3	E0 AA	E0 12	E0 71	E0 F0	71 E0 F0 12
79	←	E0 2A	E0 4B	E0 CB	E0 AA	E0 12	E0 6B	E0 F0	6B E0 F0 12
80	Home	E0 2A	E0 47	E0 C7	E0 AA	E0 12	E0 6C	E0 F0	6C E0 F0 12
81	End	E0 2A	E0 4F	E0 CF	E0 AA	E0 12	E0 69	E0 F0	69 E0 F0 12
83	↑	E0 2A	E0 48	E0 C8	E0 AA	E0 12	E0 75	E0 F0	75 E0 F0 12
84	↓	E0 2A	E0 50	E0 D0	E0 AA	E0 12	E0 72	E0 F0	72 E0 F0 12
85	PgUp	E0 2A	E0 49	E0 C9	E0 AA	E0 12	E0 7D	E0 F0	7D E0 F0 12
86	PgDn	E0 2A	E0 51	E0 D1	E0 AA	E0 12	E0 7A	E0 F0	7A E0 F0 12
89	→	E0 2A	E0 4D	E0 CD	E0 AA	E0 12	E0 74	E0 F0	74 E0 F0 12
203	Win	E0 2A	E0 5B	E0 DB	E0 AA	E0 12	E0 1F	E0 F0	1F E0 F0 12
204	App	E0 2A	E0 5D	E0 DD	E0 AA	E0 12	E0 2F	E0 F0	2F E0 F0 12

Table D-4 Scan codes with Fn key

Cap No.	Key top	Code set 1		Code set 2	
		Make	Break	Make	Break
43	ENT	E0 1C	E0 9C	E0 5A	E0 F0 5A
58	CTRL	E0 1D	E0 9D	E0 14	E0 F0 14
60	LALT	E0 38	E0 B8	E0 11	E0 F0 11
121	ARROW	45	C5	77	F0 77
122	NUMERIC	45	C5	77	F0 77
123	Scrl	46	C5	7E	F0 7E

Table D-5 Scan codes in overlay mode

Cap No.	Keytop		Code set 1		Code set 2		
			Make	Break	Make	Break	
09	8	(8)	48	C8	75	F0	75
10	9	(9)	49	C9	7D	F0	7D
11	0	(*)	37	B7	7C	F0	7C
23	U	(4)	4B	CB	6B	F0	6B
24	I	(5)	4C	CC	73	F0	73
25	O	(6)	4D	CD	74	F0	74
26	P	(-)	4A	CA	7B	F0	7B
37	J	(1)	4F	CF	69	F0	69
38	K	(2)	50	D0	72	F0	72
39	L	(3)	51	D1	7A	F0	7A
40	;	(+)	4E	CE	79	F0	79
52	M	(0)	52	D2	70	F0	70
54	.	(.)	53	D3	71	F0	71
55	/	(/)	E0 35	E0 B5	40 4A	E0 F0	4A

Table D-6 No.124 key scan code

Key top	Shift	Code set 1				Code set 2			
		Make		Break		Make		Break	
Prt Sc	Common	E0 2A	E0 37	E0 B7	E0 AA	E0 12	E0 7C	E0 F0	7C E0 F0 12
	Ctrl +	E0 37		E0 B7		E0 7C		E0 F0	7C
	Shift +	E0 37		E0 B7		E0 7C		E0 F0	7C
	Alt +		54	D4		84		F0 B4	

Table D-7 No.126 key scan code

Key top	Shift	Code set 1						Code set 2							
		Make						Make							
Pause	Common*	E1	1D	45	E1	9D	C5	E1	14	77	E1	F0	14	F0	77
	Ctrl*	E0	46	E0	C6			E0	7E	E0	F0	7E			

*: This key generates only make codes.

Appendix E Key Layout

E.1 United Kingdom (UK) Keyboard

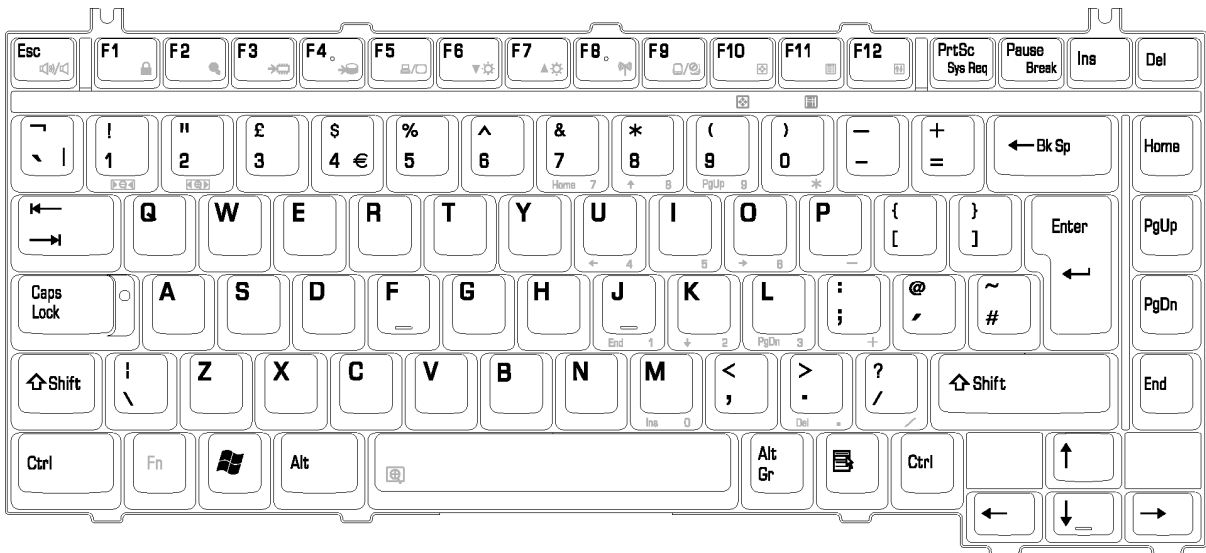


Figure E-1 UK keyboard

E.2 United States (US) Keyboard

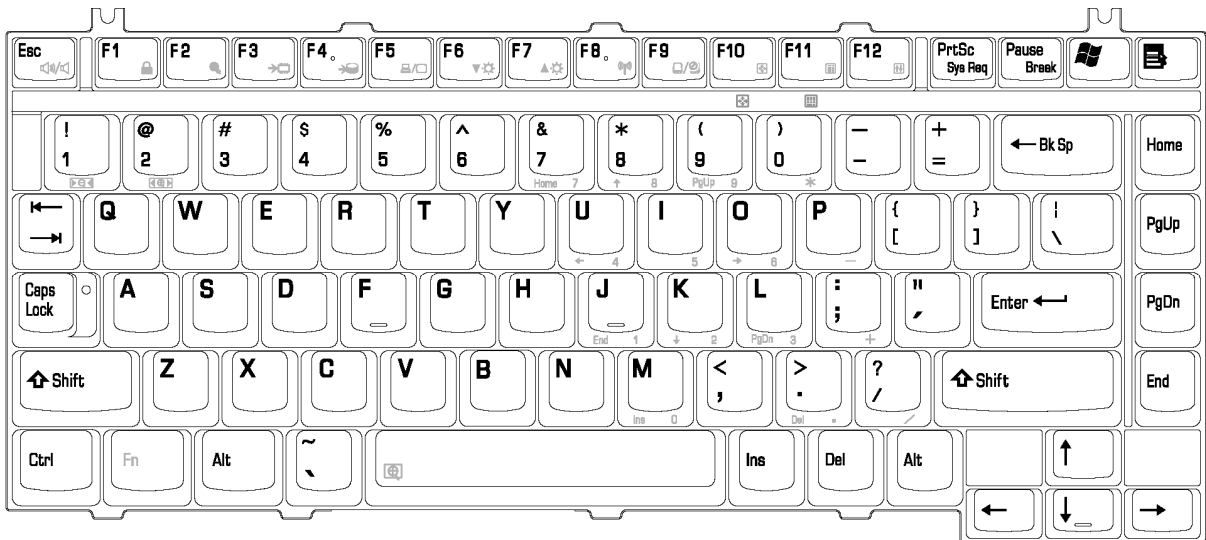


Figure E-2 US keyboard

Appendix F Wiring diagrams

F.1 RGB Monitor Loopback Connector

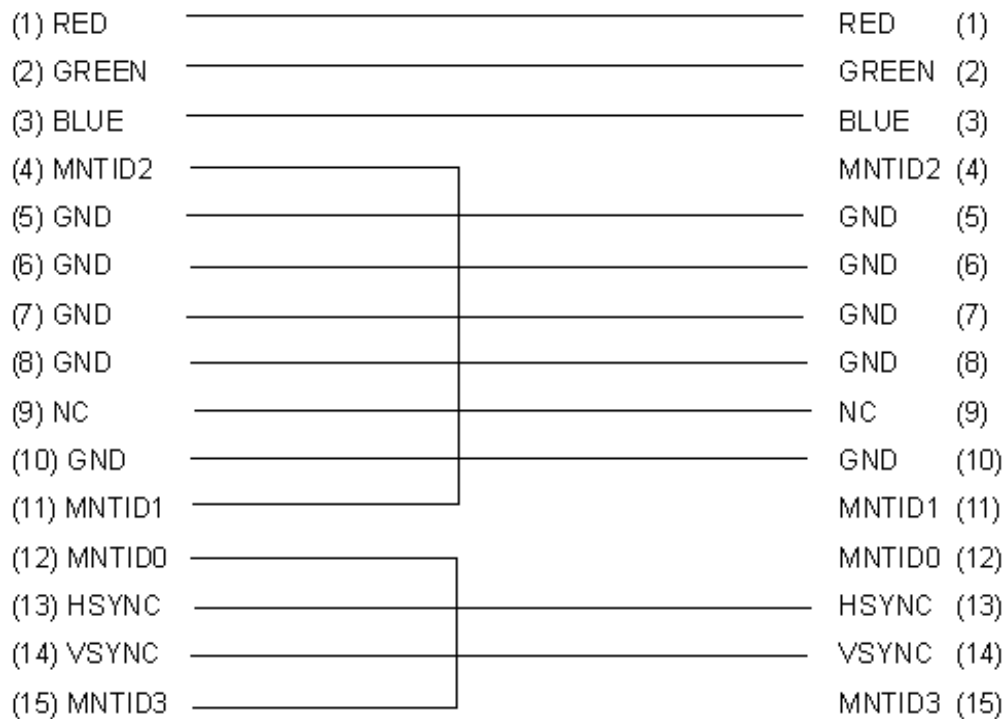


Figure F-1 RGB Monitor Loopback Connector

F.2 RS-232C Loopback Connector

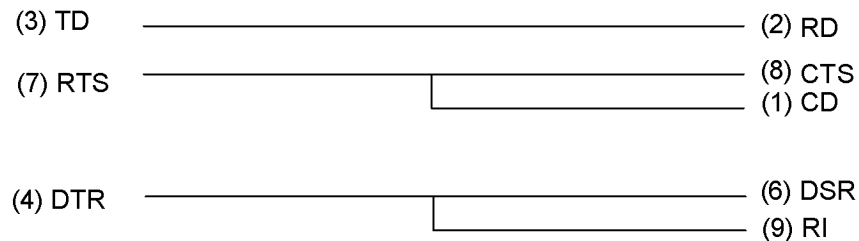


Figure F-2 RS-232C Loopback Connector

F.3 RS-232C direct connection cable (9-pin to 9-pin)

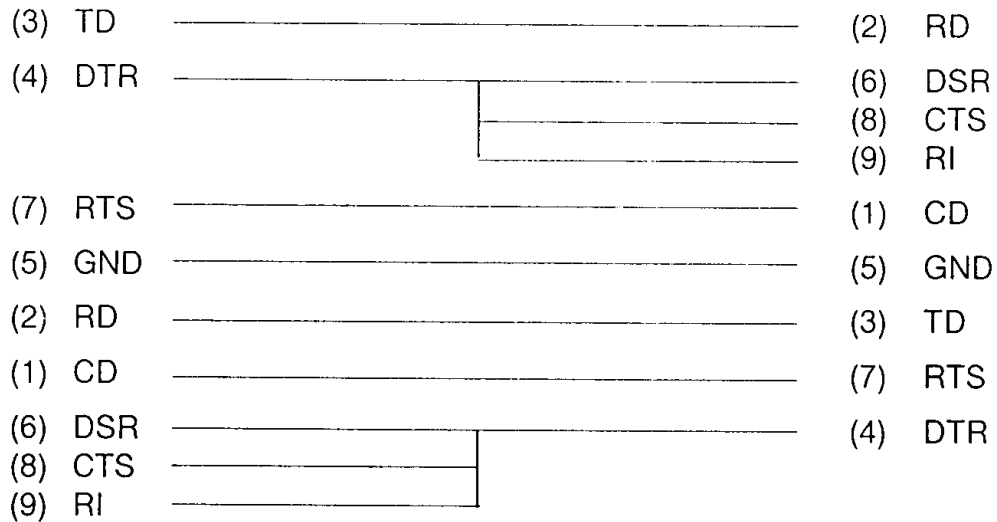


Figure F-3 RS-232C direct connection cable (9-pin to 9-pin)

F.4 RS-232C direct connection cable (9-pin to 25-pin)

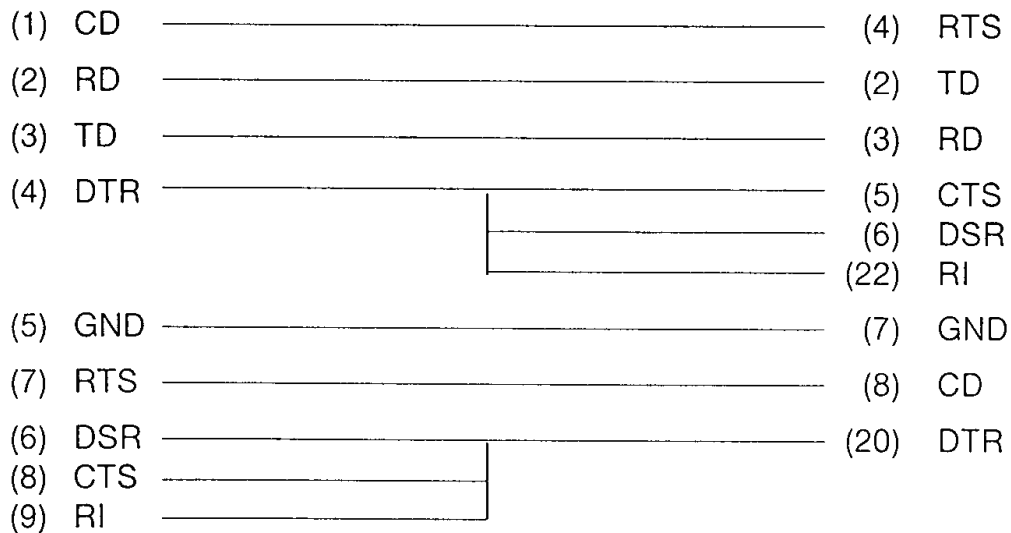


Figure F-4 RS-232C direct connection cable (9-pin to 25-pin)

F.5 LAN Loopback Connector

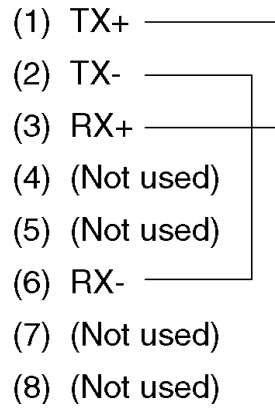


Figure F-5 LAN Loopback Connector

Appendix G BIOS rewrite procedures

This Appendix explains how to rewrite the system BIOS program when you update the system BIOS.

Tools

To rewrite the BIOS, you need the following tool:

- BIOS/EC/KBC rewriting disk for the computer that has renewed BIOS data.

Rewriting the BIOS

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC card.
4. Connect an USB FDD and insert the BIOS/EC/KBC rewriting disk into the USB FDD.
5. Turn on the power while holding down the tilde character key until a beep sounds.

For example



(US Keyboard)



(UK Keyboard)

(There is the key at the left side of the **1** key in the UK key board.)

6. The BIOS rewriting starts
7. When the process is completed, it beeps and the system automatically reboots.

<p>NOTE:</p> <ol style="list-style-type: none">1. <i>Connect the AC adapter to the computer when you rewrite the BIOS.</i>2. <i>Do not turn off the power while you are rewriting the BIOS. If the rewrite fails, it might be impossible to start up the computer.</i>3. <i>If you fail to rewrite BIOS, then when you next turn on the power, a message may be displayed that the contents of the BIOS have been erased. In this case, insert the BIOS rewriting disk and the BIOS will be rewritten.</i>

Appendix H EC/KBC rewrite procedures

This Appendix explains how to rewrite the EC/KBC system program when you update the EC/KBC system.

Tools

To rewrite the EC/KBC, you need the following tool:

- ❑ EC/KBC rewriting disk for the computer

Rewriting the EC/KBC

- NOTE:**
1. Rewrite the EC/KBC only when instructed by a diagnostic disk release notice.
 2. Connect the AC adaptor to the computer when you rewrite the EC/KBC.
 3. Do not turn off the power while you are rewriting the EC/KBC. If the rewrite fails, it might be impossible to start up the computer.
 4. If you fail to rewrite EC/KBC, then when you next turn on the power, a message may be displayed that the contents of the EC/KBC have been erased. In this case, insert the BIOS/EC/KBC rewriting disk and the EC/KBC will be rewritten.
 5. Normally it takes about 30 seconds to rewrite the EC/KBC. It may take 3 minutes (maximum), depending on the conditions of the computer or ICs. The computer is not hung up. Allow sufficient time. Never reboot or turn off the power to the computer before the rewriting is completed.

1. Set the system to boot mode.
2. Turn off the power to the computer.
3. Remove the external cable and PC Card.
4. Connect an USB FDD and insert the BIOS/EC/KBC rewriting disk into the USB FDD.
5. Turn on the power while holding down the **Tab** key. (Keep holding down the key until a beep sounds.) The EC/KBC rewriting starts.
6. When the EC/KBC rewrite is completed, the system is automatically turned off.

Appendix I Reliability

The following table shows MTBF (Mean Time Between Failures).

Table I-1 MTBF

	Time (hours)
Intel chipset model System	5,108h
ATI chipset mode System	5,111h

